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**A COMPREHENSIVE RAPID-ASSESSMENT-OF-
FLUTTER / EJECTION-LOADS (RAFEL) SOFTWARE
SYSTEM FOR AIRCRAFT / STORE COMPATIBILITY**

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13. ABSTRACT (Maximum 200 words) This report documents a design scheme for a rapid assessment of flutter and limit cycle oscillation of aircraft with multiple store configurations. Using the F-16A as a baseline aircraft, three different aeroelastic instability responses, including classical flutter, typical LCO, and non-typical LCO, have been successfully identified. These three distinct responses are representative of the broad spectrum of aeroelastic responses encountered by fighter aircraft with external stores. To rapidly compute the flutter prediction of the aircraft with multiple store configurations, a procedure is proposed to efficiently reuse the aerodynamic influence coefficient (AIC) matrices of aircraft with multiple stores. The procedure used the ZAERO code, that contains a unified aerodynamic module for all Mach numbers, as the basic software system. To discern the difference between the flutter and LCO responses, and to correlate the numerical predictions with the flight altitude, the matched point option of the g-method of ZAERO was used. The influence of the aerodynamic stores on the aeroelastic instability is investigated using a number of aerodynamic models, including the isolated wing-tip launcher model, and the whole aircraft with and without stores. Using a more refined aerodynamic model, the results show good agreement between the present numerical predictions and flight flutter test data, including the oscillation frequency and the onset speed of the three flutter and LCO cases.				
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FOREWORD

This Phase I SBIR final technical report entitled "*A Comprehensive Rapid-Assessment-of-Flutter / Ejection-Loads (RAFEL) Software System for Aircraft / Store Compatibility*," has been prepared by ZONA Technology, Inc. (ZONA), under contract number FO 863501-C-0049, sponsored by The Department of The Air Force/Air Armament Center, Eglin Air Force Base, FL 32542. This report presents the findings as of January 16, 2002, from a research and development program begun April 16, 2001.

Mr. Ping-Chih Chen of ZONA was the Principal Investigator, Mr. E. Sulaeman and Dr. D.D. Liu of ZONA were co-principal investigators. Mr. Major Baron Canty and Dr. Charles M. Denegri Jr. of Eglin Air Force Base were the Government Technical Monitor. The author would like to thank Dr. Denegri for providing structural and aerodynamic data and for his valuable comments and suggestions throughout the course of this development.

This report documents the entire work under the Phase I effort. It is published for the dissemination of technical information. The findings and conclusions are those of the authors and do not necessarily represent the views of the United States Government. Distribution of this report shall be in accordance with the Distribution Statement of the Report Documentation page found on the cover hereof.

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ACRONYMS

AIC	Aerodynamic Influence Coefficient
ASE	Aeroservoelasticity
CFD	Computational Fluid Dynamics
CFL3D	High-level computational fluid dynamics code by NASA (Ref 19)
CPU	Computational Processing Unit
DLM	NASTRAN's code to generate steady/unsteady subsonic aerodynamics based on a doublet lattice method.
DMAP	Direct Matrix Abstraction Program
DMS	Data Mining System
FEM	Finite Element Model
GUI	Graphical User Interface
LCO	Limit Cycle Oscillation
MATLAB	Matrix Laboratory (An interactive system and programming language for general scientific and technical computation.)
MSM	Massive Store Management
NASTRAN	Structural FEM software product of MSC

PVM	Parallel Virtual Machine
RAFEL	Rapid Assessment of Flutter / Ejection Load
SDG	Store Database Generator
UAIC	Unified Aerodynamic Influence Coefficient
ZAERO	ZONA's aeroelasticity and unstable aerodynamic software system covering all Mach ranges including ZONA6, ZONA7, ZTAIC and ZONA7U for complex aircraft configuration with external stores (Ref 6-10)
ZDM	ZONA Dynamic Module
ZONA	ZONA Technology, Inc.
ZONA51	ZONA's code implemented in NASTRAN to generate steady/unsteady supersonic aerodynamics for complex aircraft configuration with external stores (Ref 4). Capable to handle only flat type configuration.
ZONA6	ZONA's code to generate steady/unsteady subsonic aerodynamics for complex aircraft configuration with external stores (Ref 6)
ZONA7	ZONA's code to generate steady/unsteady supersonic aerodynamics for complex aircraft configuration with external stores (Ref 7)
ZONA7U	ZONA's code to generate steady/unsteady unified hypersonic and supersonic aerodynamics for wing-body/aircraft configurations with external stores(Ref 8)
ZTAIC	ZONA's Transonic Aerodynamic Influence Coefficient code; Generates unsteady transonic aerodynamics for complex aircraft configuration (Ref 7)

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SECTION 1

INTRODUCTION

This final technical report describes the work performed by ZONA Technology, Inc. (ZONA) under an SBIR Phase I contract FO8635-01-C-0049, entitled "*A Comprehensive Rapid-Assessment-of-Flutter/ Ejection-Loads (RAFEL) Software System for Aircraft /Store Compatibility*".

The overall Phase I technical objective is to develop an accurate and computationally efficient software system for the aeroelastic solutions of massive number of aircraft/store configurations.

The F16 is selected as a baseline aircraft with the following specific objectives:

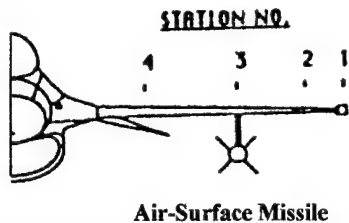
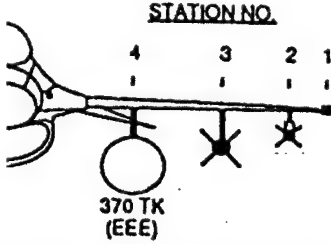
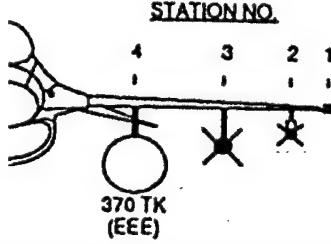
1. Investigate the accuracy of ZONA's Aeroelastic Software System (ZAERO) to predict aeroelastic instability of the F-16 aircraft with multiple stores for subsonic, transonic and supersonic Mach number.
2. Investigate the capability of ZAERO to differentiate various types of aircraft/store aeroelastic instability behavior including classical flutter, typical limit cycle oscillation (LCO) and non-typical LCO.
3. Validate the accuracy of ZAERO aeroelastic system with the flight test data of three proposed F-16/store configurations (Table 1.1).
4. Using ZAERO as the basic software system, design a *Massive Store Management (MSM)* system that can substantially increase the computational efficiency of ZAERO.

In this Phase I effort, we have accomplished the following:

- Performed aeroelastic instability computation using ZAERO for a number of F-16 aircraft in subsonic, transonic and supersonic flight regimes and at various altitudes.
- Investigated the influence of various store aerodynamic models including underwing/tip launchers, weapons and fuel tank aerodynamic model to the aeroelastic behavior of the whole aircraft/store configurations.
- Investigated the influence of aircraft rigid body modes to the aeroelastic instability of various aircraft/stores configurations.
- Investigated the capability of linear and nonlinear unsteady aerodynamic procedures of ZAERO to differentiate various aeroelastic instability behavior including classical flutter, typical limit cycle oscillation (LCO) and non-typical LCO of F-16 aircraft with multiple stores.
- Investigated the correlation between the flight test data of the three proposed F-16/store configurations and the aeroelastic response computed using ZAERO.
- Designed the Massive Store Management (MSM) system as a platform to the rapid aeroelastic prediction (RAFEL) scheme based on the ZAERO aeroelastic system for the assessment of flutter/LCO of massive aircraft/store configurations.

To validate the accuracy of the present procedure, three configurations of F-16A Block 15 given in Reference 1 are selected and shown in the following Table.

Table 1.1 F-16A Store Configurations.

Sta. No.	Aeroelastic Response Type		
	Case 1 Classical Flutter	Case 2 Typical LCO	Case 3 Non-typical LCO
1	LAU-129/A launcher	LAU-129/A launcher	16S210 launcher
2	Empty Station	LAU-129/A launcher AIM-9L missile	LAU-129/A launcher AIM-9L missile
3	Launcher/pylon Air-surface missile	Launcher/pylon Air-surface missile	Launcher/pylon AIM-120A missile
4	Empty Station	Pylon 370-gal fuel tank (empty)	Pylon 370-gal fuel tank (empty)
Front View			

1.1 Background

Flutter clearance of a modern fighter aircraft with massive store/weapon configuration is a major engineering task in aircraft/store weapon compatibility. This task requires expedient and yet accurate solutions in a short-time framed demanded by rapid military responses when facing today's ever-changing international situation. Since there can be more than 400,000 store/weapon combinations for a typical fighter aircraft, the flutter clearance for such configuration requires not only the solution accuracy but also computational efficiency to rapidly identify the critical cases. The procedure is needed also to identify a wide variety of aeroelastic response characteristics including flutter, divergence and limit cycle oscillation.

1.2 Limit Cycle Oscillation (LCO) of Wing with External Stores

Limit Cycle Oscillation (LCO) has been a persistent problem on several current fighter aircrafts and is generally encountered with external store configurations. Denegri (Ref 2) provided a detailed description of the aircraft/store LCO phenomenon. Norton (Ref 3) gave an excellent overview of LCO of fighter aircraft carrying external stores and its sensitivity to store carriage configuration and mass properties.

LCO can be characterized as sustained periodic oscillations which neither increase nor decrease in amplitude over time for a given flight condition. Using a refined aerodynamic model of the aircraft and stores, ZONA (Chen, Sarhaddi and Liu – Ref 4) has shown that wing/store LCO is a post-flutter phenomenon whenever the flutter mode contains low unstable damping. This type of flutter mode is called “hump mode”. Since the aircraft structure usually contains structural nonlinearity such as friction damping, this amplitude-dependent friction damping can stop the growth of amplitude (due to flutter), thus the structural system would result in steady-state oscillation. This is known as LCO. By contrast, a typical flutter mode is a result of growth of amplitude largely due to destabilizing negative aerodynamic damping, hence a drastic increase in damping beyond the neutral stability point, or the flutter point ($g = 0$). A typical flutter mode and hump mode are shown in Figure 1.1.

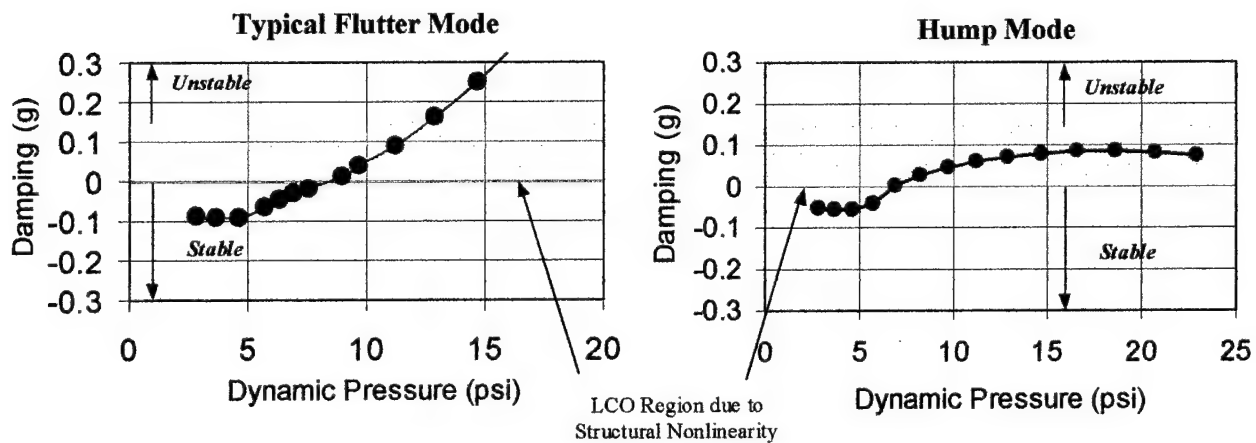


Figure 1.1 Typical Flutter Mode and Hump Mode by Flutter Analysis

Admitting nonlinear friction damping, Denegri (Ref 5) also showed consistent trends that hump mode can be used to correlate the flutter solutions with LCO flight test data of F-16's. Since the structural characteristic varies for different aircraft/store configurations, it is unlikely that the fixed-gain type of control system would work for wing/store LCO suppression in general. It appears that an adaptive controller with an online system identification process would be most appropriate for LCO suppression of a wide range of aircraft/store configurations.

1.3 Technical Issues and Challenges

Rapid assessment of flutter/LCO of aircraft with multiple stores presents challenging problems to be resolved. Several pertinent technical issues are addressed as follows.

- *Solution Accuracy Including Algorithm Robustness, Modeling Fidelity, and Extended Flight Regimes*

Current engineering analysis enjoys sufficient accuracy provided by the structural finite element (FEM) methodology. But a compatible level of accuracy provided by unsteady

aerodynamics for flutter/ejection loads is lacking. This calls for an unsteady aerodynamic method that can deal with complex configurations such as a whole aircraft with external stores in all flight regimes including subsonic, transonic and supersonic Mach numbers, and with sufficient solution accuracy.

- *Computational Efficiency for Massive Store/Aircraft Combinations*

CFD has become an accurate tool for aerodynamic analysis/design. Recognized by experienced aeroelasticians, however, unsteady CFD is far from being an efficient tool for aircraft aeroelastic analysis, let alone for the massive store/aircraft aeroelastic requirement. Using the CFL3D code (Ref 2), ZONA's recent study shows that it requires 4 days of computing time to complete a transonic LCO study on a 1 GHz computer of a two-dimensional (2-D) airfoil (Ref 3). The requirement to process 2000 flutter configurations in two weeks is a stringent one. Since unsteady CFD is out of the question, one resorts to the well-practiced unsteady-aerodynamics computational procedure called AIC (Aerodynamic Influence Coefficient) matrix. The merit of AIC matrix is that it will provide the corresponding unsteady aerodynamics (in frequency domain) to a fixed aerodynamic configuration, but can couple with alternative structural arrangements. The AIC, and hence the unsteady aerodynamics, is computed once and for all and can be re-used for repetitive aeroelastic computations. For slightly different aerodynamic configurations such as the same aircraft with different stores, only a small subset (sub-matrix) of the AIC matrix needs to be regenerated.

- *Rapid Selection for Critical Flutter, LCO and Ejection Loads*

This calls for an automated *data mining system* that can search for and identify the critical flutter, LCO and ejection loads through the data set generated by massive flutter/ejection load analyses. In addition, this data mining system must be able to recognize an LCO case from the flutter-solution cases, to identify the severity of the flutter instability, to compute the sensitivity of the flutter/LCO to the change of flight speed, and to provide recommendations regarding the need of additional flight test to confirm the software predictions.

1.4. Overall Design Strategy

It appears that the newly released ZAERO aeroelastic software system is a viable methodology to answer all the above technical challenges. ZAERO is a comprehensive aeroelastic software system which contains over a dozen modules for arbitrary aircraft configurations with complex store/weapon combination. Application of ZAERO for the rapid assessment of the aircraft/store aeroelastic instability can be constructed based on the following two parts:

- *The off-line analysis.* In this stage, the most time consuming computation of the unsteady aerodynamic and structural finite element data base of the aircraft/store are generated. Only the portion invariant to the changes in the store configuration is generated. For a typical flutter calculation of the aircraft/store, the invariant portion of the aerodynamic data base can be as large as 95% ~ 99% of the total aerodynamic data required. This off-line analysis stage

can be performed independent of any store configuration. The generation of the database in the off line analysis clearly will reduce the computational time significantly.

- *The on-line analysis.* In this stage only small portion of the calculation is needed to generate the aerodynamic data associated with the variation of the store configurations.

1.5 Required Software Tools

Two engineering disciplines in terms of software tools are employed for the present study, namely MSC/NASTRAN and ZAERO. MSC/NASTRAN is used to perform the structural finite element (FEM) analysis and to generate the generalized mass and stiffness matrices as well as mode shapes of the aircraft structure. ZAERO is ZONA's commercialized aeroelastic software system that integrates the essential disciplines required by aeroelastic and aeroservoelastic design/analysis.

SECTION 2

COMPREHENSIVE RAPID-ASSESSMENT-OF- FLUTTER/EJECTION-LOADS (RAFEL) SOFTWARE SYSTEM

The RAFEL software system consists of three sub-systems: an invariant unified aerodynamic influence coefficient (UAIC) submatrix generation system, a Massive Store Management (MSM) system, and a data mining system. The core of the RAFEL system is the ZAERO aeroelastic system which is used as a tool to generate the AIC matrix and solve the aeroelastic system of equations. A detailed description of ZAERO is presented first in the next section, followed by the application of ZAERO in the RAFEL system.

2.1 ZAERO – An Engineer's Toolkit for Aeroelastic Solutions

ZAERO is ZONA's aeroelastic software system that integrates the essential disciplines required by aeroelastic and aeroservoelastic design/analysis (Ref 17). Figure 2.1 illustrates six essential modules in ZAERO that consist of five engineering modules namely the Unified AIC (UAIC), 3-D spline, flutter, aeroservoelasticity (ASE) and transient loads modules and a memory and database management system called the ZDM module.

The functionality of the ZDM (ZONA Dynamic Memory and Database Management System) module is equivalent to the DMAP/GINO system of MSC/NASTRAN. The entire ZAERO program architecture is developed based on the ZDM module that controls the input/output data entities of all engineering modules. The ZDM module will also serve as a basic database system for the development of the proposed massive-store management system. Throughout the years, all of the ZAERO modules have been continuously validated by many test cases ranging from the verification with exact solutions for simple geometries to the comparison with experimental or CFD data for complex configurations. The main features of these five modules now follow.

The UAIC Module

The UAIC module shown in Figure 2.1 consists of four unsteady aerodynamic methods, namely ZONA6, ZTAIC, ZONA7 and ZONA7U, which jointly provide a Unified Aerodynamic Influence Coefficient (UAIC) matrix covering all Mach numbers for complex aircraft/store configurations. By contrast, MSC/NASTRAN contains only the DLM method for subsonic flows and the ZONA51 method for supersonic flow and can only handle flat-plate type configurations. Note that ZONA51 method (Ref 4) in MSC/NASTRAN is a ZONA software product for supersonic lifting surface unsteady aerodynamics that has been integrated into the aeroelastic option of MSC/NASTRAN since 1990. Today, ZONA51 has become the industrial standard method for supersonic lifting surface unsteady aerodynamics with over 120 users worldwide. The features of these four unsteady aerodynamic methods in the UAIC module are:

- ZONA6 (Ref 5): generates steady/unsteady subsonic aerodynamics for wing-body/aircraft configurations with external stores/nacelles including body wake effects.
- ZTAIC (Ref 6): generates unsteady transonic (modal) AIC's using externally-provided steady mean pressures.

- ZONA7 (Ref 7): generates steady/unsteady supersonic aerodynamics for wing-body/aircraft configurations with external stores/nacelles (formerly ZONA51 for lifting surfaces).
- ZONA7U (Ref 8): generates steady/unsteady unified hypersonic and supersonic aerodynamics for wing-body/aircraft configurations with external stores/nacelles.

Among these four methods, the transonic code ZTAIC is capable of predicting the “*transonic dip*” associated with flutter boundary of fighters. While using steady pressure input (provided by measurements or a CFD Navier-Stokes Solver), the ZTAIC method solves the transonic small disturbance equation for unsteady aerodynamics. Unlike typical CFD methods, ZTAIC does not require grid generation. Because of the accurate steady pressure input, the correct unsteady shock location and strength computed by ZTAIC are ensured. This can be seen by the excellent correlation between ZTAIC prediction and wind tunnel test data of the AGARD 445.6 transonic flutter boundary (Figure 2.2) and the unsteady pressure distribution of the oscillating Lessing wing (Figure 2.3).

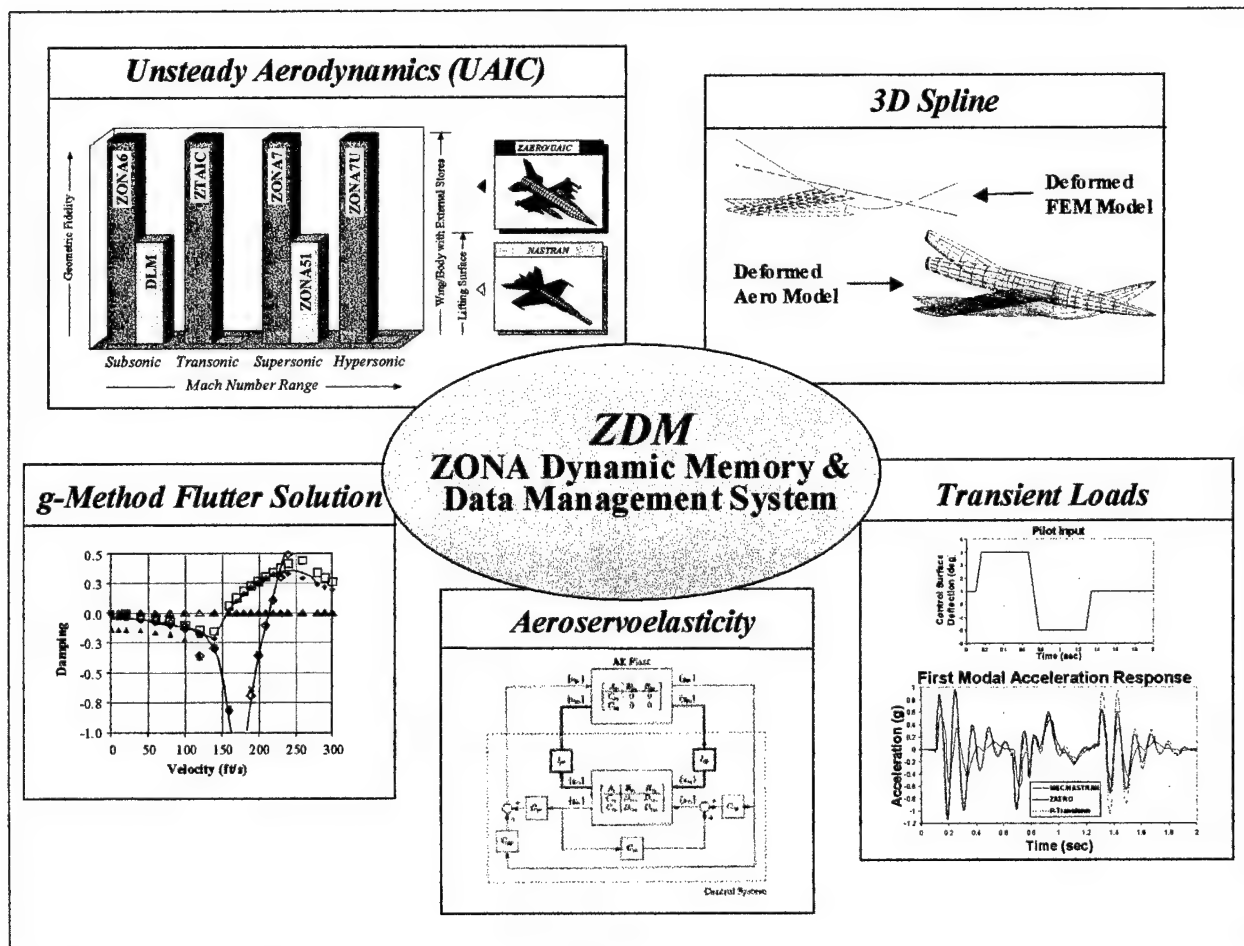


Figure 2.1 Six Essential Modules in ZAERO.

As discussed earlier, due to the pure-aerodynamic characteristics of the AIC matrix, the UAIC matrices generated by the UAIC module can repeatedly be used when changes in different structural properties or slightly different aerodynamic configurations are needed in aeroelastic analysis/design. This renders ZAERO a computationally efficient tool for massive flutter analysis.

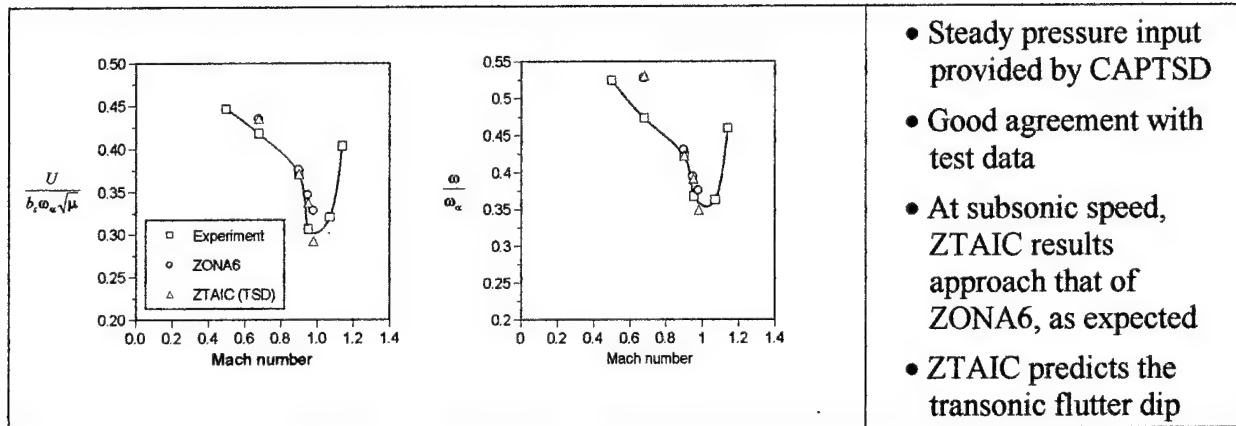


Figure 2.2 AGARD Standard 445.6 Wing.

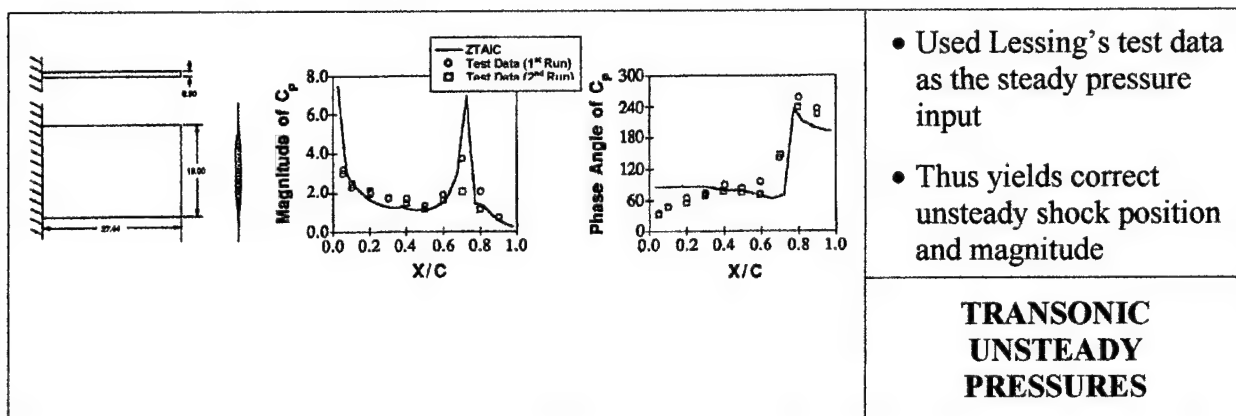


Figure 2.3 Lessing Wing in First-Bending Oscillation ($M=0.9$, $k=0.13$, $\eta=0.5 \times \text{span}$).

The 3-D Spline Module

For low fidelity unsteady aerodynamic methods like DLM, the Infinite Plate Spline (IPS, Ref 9) is sufficient for the transfer of data between the structural and aerodynamic models. To perform the data transfer for high fidelity modeling of an entire aircraft/store configuration requires a 3-D spline capability. The 3-D spline module of ZAERO is equipped with an improved 3-D Thin Plate Spline (TPS, Ref 10) method that provides the displacements and loads in six degrees of freedom at each structural and aerodynamic grid point. The 3-D spline module can also be used to generate a deformed aerodynamic model to verify the spline input by graphical visualization. A typical graphical display of a deformed wing-body configuration is shown in the 3-D spline module diagram of Figure 2.1.

The Flutter Module/g-Method

The flutter module consists of two flutter solution techniques; *the K-method* and *the g-method*. The g-method is a ZONA's newly developed flutter solution method (Ref 11) that generalizes the K-method and the P-K method for true damping prediction. The g-method is superior to the P-K method by the following merits.

- *True Damping Prediction*

The theoretical foundation of the true-damping prediction capability of the g-method is based on the inclusion of a first-order aerodynamic damping term in the flutter equation that is rigorously derived from the Laplace domain aerodynamics. Such a true-damping prediction capability is lacking in the K-method and P-K method.

- *Solution Robustness: the g-Method*

The g-method utilizes a reduced frequency sweep technique to search for the roots of the flutter equation and a predictor-corrector scheme to ensure the robustness of the sweep technique. The P-K method typically requires an iterative procedure for flutter solutions and occasionally suffers from a solution breakdown. By contrast, the g-method's sweep technique is proven to be efficient and robust and can obtain an unlimited number of aerodynamic lag roots. The inclusion of aerodynamic lag roots can provide important physical insight of the flutter solutions.

- *Match-Point Flutter Solutions*

The generalized formulation of the g-method (as opposed to the K-method and the P-K method) provides an automated matching feature of the flutter solution that satisfies the Mach number-velocity-density relations of a given atmospheric table.

Therefore, with the g-method built in, the flutter module in ZAERO can further be developed as an effective *data mining system* to search for critical flutter, LCO and ejection load cases. This is attributable to:

- Its true damping prediction can accurately identify the severity and sensitivity of the flutter instability. With a nonlinear structural damping criteria which will be shown in the later section, the g-method solution can be used to recognize an LCO case from the flutter-solution cases.
- Its match-point flutter solution feature avoids an additional iterative procedure between the densities and velocities which is normally required by a non-match-point flutter solution procedure. Therefore, the match-point flutter solution can be directly correlated with flight test data.
- Its reduced frequency sweep technique can ensure the robustness of an automated data mining system which would not work with an unreliable P-K method.

In addition, the ZAERO/flutter module has an existing capability for rapid flutter solutions of aircraft with different inertial properties (for instance, the fuel weight variations). This capability utilizes a so-called "*mass increment technique*" which perturbs the following flutter equation with incremental mass ΔM , i.e.

$$\phi^T (M + \Delta M) \phi \ddot{q} + \phi^T k \phi q = q_\infty Q(ik) q \quad (2.1)$$

where:

$\phi^T M \phi$ and $\phi^T k \phi$ are the generalized mass and stiffness matrices, respectively, of the baseline aircraft.

$q_\infty Q(ik)$ is the generalized aerodynamic force, q is the generalized modal coordinate, ϕ is the mode shapes of the baseline aircraft, and

ΔM is the incremental mass added to (or subtracted from) the baseline aircraft, e.g., increase (or decrease) of fuel in the tank.

The validity of Eq (2.1) lies in the fact that the flutter mode of the aircraft with the incremental mass can be expressed by the mode shapes of the baseline aircraft (without incremental mass) if a sufficient number of modes are used. This also implies that solving Eq (2.1) does not require additional FEM and unsteady aerodynamic analysis because all matrices in Eq (2.1) remain unchanged except ΔM , an input parameter.

Some ZAERO users have adopted the mass increment technique to accelerate the massive store screening process by also ignoring underwing store aerodynamics. In this way, a very fast procedure results for flutter solution generation of thousands of store configurations by using only one set of AIC and FEM solutions. This procedure can be used as a preliminary step to compliment the MSM procedure for rapid screening of critical flutter cases. ZONA has implemented this procedure as an option in the RAFEL system.

2.2 Application of ZAERO to RAFEL Software System

The RAFEL software system consists of three sub-systems: an invariant unified aerodynamic influence coefficient (UAIC) submatrix generation system, a Massive Store Management (MSM) system and a data mining system.

2.2.1 Invariant UAIC Submatrices for Store/Aircraft Configurations

The unified Mach number Aerodynamic Influence Coefficient (UAIC) matrix generated by the ZAERO/UAIC module is a pure aerodynamic entity and is independent of the structural properties. For a given aircraft with multiple stores, this UAIC (at a given Mach number and reduced frequency pair) can be partitioned into five different kinds of submatrices, i.e.

$$[UAIC] = \begin{bmatrix} A_{aa} & A_{s_1a} & \dots & A_{s_ja} \\ A_{as_1} & A_{s_1s_1} & \dots & A_{s_1s_j} \\ \vdots & \vdots & \ddots & \vdots \\ A_{as_i} & A_{s_1s_i} & \dots & A_{s_js_i} \end{bmatrix} \quad (2.2)$$

A_{aa} is the aircraft-to-aircraft aerodynamic submatrix

$A_{s_i s_i}$ is the i^{th} store-to- i^{th} store aerodynamic submatrix

$A_{s_i a}$ is the i^{th} store-to-aircraft aerodynamic submatrix

A_{as_i} is the aircraft-to- i^{th} store aerodynamic submatrix, and $A_{s_i s_j}$ and $A_{s_j s_i}$, where $i \neq j$, represents the store-to-store aerodynamic submatrix between each two different stores.

The only submatrices in Eq (2.2) that need to be newly computed are the store-to-store submatrices (shaded areas in Eq 2.2) $A_{s_i s_j}$ and $A_{s_j s_i}$, where $i \neq j$. Clearly, the self-influence submatrices A_{aa} and $A_{s_i s_i}$ shown above are invariant as long as their own aerodynamic shapes remain the same. For a given type of store designated to a fixed weapon-carriage station, it can be seen that $A_{s_i a}$ and A_{as_i} are also invariant since the store-carriage stations with respect to a designated aircraft remain fixed. This implies that the submatrices A_{aa} , $A_{s_i s_i}$, $A_{s_i a}$, and A_{as_i} can be pre-computed and saved in a database. For a given new store arrangement, these submatrices need not be re-computed, rather they can be retrieved from the database. In so doing, the computing effort of the total UAIC matrix generation can be substantially reduced. In fact, the proposed Massive Store Management (MSM) software system is constructed according to this proposed procedure which will be discussed in the next section.

2.2.2 The Total RAFEL Software Architecture

Figure 2.4 depicts the total software system architecture for massive flutter, LCO, ejection load analysis and the critical case selection. This software system consists of three subsystems: an invariant UAIC submatrix generation system, a Massive Store Management (MSM) software system, and a data mining system.

Invariant UAIC Submatrix Generation System

The functionality of this system is to generate the A_{aa} , $A_{s_i s_i}$, $A_{s_i a}$, and A_{as_i} invariant UAIC submatrices, where $i = 1, \dots, n$, and n represents the number of all available stores with their associated weapon-carriage stations. The generation of these invariant submatrices is based on the assumption that the designated aircraft has fixed weapon-carriage stations. For instance, the F-16 aircraft shown in Part 1 of Figure 2.4 has 9 weapon-carriage stations. Every station has a set of candidate stores to be carried.

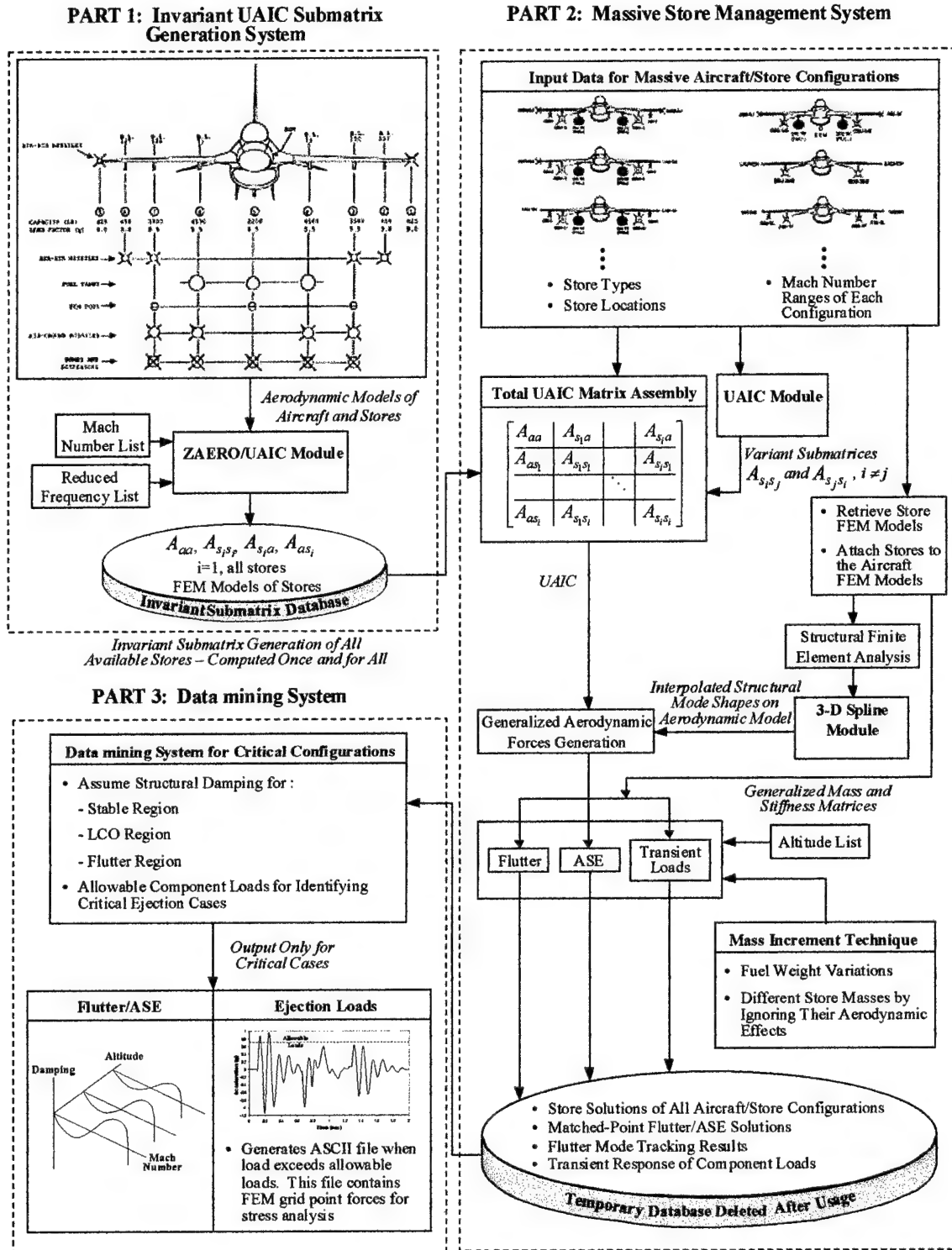


Figure 2.4 The Total RAFEL Software Architecture.

To design the invariant UAIC submatrix generation system, we first provide each store a label called the “*store label*” which marks the store and its designated weapon-carriage station. Note that a different store label is assigned for the same store located at different stations. Next, the

ZAERO/UAIC module is employed to generate the UAIC submatrices $A_{s_i s_i}$, $A_{s_i a}$ and $A_{a s_i}$ of all stores and save these submatrices in a database. Because the aircraft-to-aircraft submatrix A_{aa} is independent of stores, it only needs to be computed once. Note that each of the invariant matrix is also a function of Mach number and reduced frequency. These Mach numbers and reduced frequencies can be pre-selected according to the flight envelope of the designated aircraft and its structural characteristics. Clearly, to generate the above database that contains the invariant submatrices of all stores requires a large computing time. However, since these submatrices are computed once and for all, this long computing time should be considered as off-line data preparation and hence should not influence the efficiency of the subsequent massive store/aircraft aeroelastic analysis. Of course, if a new store is added to the list, its associated submatrices need to be newly computed in this manner and added to the database.

Massive Store Management System

The Massive Store Management (MSM) system is essentially a database management system for the total UAIC matrix assembly. For a given aircraft with multiple store configuration, the MSM system first retrieves the invariant submatrices from the database. Next, it activates the ZAERO/UAIC module to compute all variant submatrices. Finally, it assembles the invariant and variant submatrices together and generates the total UAIC matrix. Once the total UAIC matrix is obtained, the remaining tasks for an aeroelastic analysis are performed by the existing ZAERO engineering modules, as shown in Part 2 of Figure 2.4.

The 3-D spline module reads the output of the structural finite element analysis of the given aircraft/store configuration and computes the interpolated mode shapes on the aerodynamic model. Once these mode shapes and the total UAIC matrix are available, the generalized aerodynamic force matrices can be obtained immediately for an aeroelastic analysis, i.e. flutter, ASE or transient load analysis. This analysis is performed at various altitudes, and the solution at every Mach number and altitude pair is a matched-point solution.

It should be noted that the MSM system is a fully automated process. For a given aircraft/store configuration, the input of the MSM system (e.g., the one shown in Part 2 of Figure 2.4) is the store label of each store and the Mach number range of interest. Since this constitutes a small amount of input, it takes little effort to set up an input file for a massive number of aircraft/store configurations. The MSM system continuously processes each configuration and stores its aeroelastic solutions on a temporary database. Thus, once the MSM system is activated, manual interaction from the engineer is no longer required.

Data Mining System

The main objective of the data mining system is to rapidly screen through the temporary database generated by the MSM system and to select the critical flutter, ASE, or ejection load cases for output display. The inputs of the critical flutter/ASE cases are the assumed structural damping levels that define three stability regions, namely the stable region, the LCO region, and the flutter region. The data mining system screens through all the damping solutions at every Mach number and altitude (M-h) pair for a particular aircraft/store configuration. If the damping

solutions at all M-h pairs are below the stable region, this configuration is classified as non-critical configuration and no output is displayed. If the damping solutions are above the stable region, a three-axis graphical file is generated which can display the damping solutions vs. Mach numbers and altitudes, as the one shown in Part 3 of Figure 2.4. The regions in the graphical display where the damping solutions exceed the LCO region are highlighted. A similar display for the frequency solution is also generated. It should be noted that since all flutter results generated by the g-method and the ASE analysis are matched-point solutions with true damping values, these results can be directly correlated with the flight test data. The time history shown in Part 3 of Figure 2.4 is a typical output in terms of component loads of the ejection load analysis. Again, only those configurations whose transient loads exceed the specified allowable loads are displayed. The corresponding region which exceeds the allowable loads will also be highlighted in the display.

2.2.3 Store-Aircraft Finite Element Modal Analysis Adopting the MSM System

To generate structural finite element models of massive number of aircraft/store configurations is a very time consuming task. However, the massive store management (MSM) system can be adopted to also automatically generate the finite element models. This is very similar to, but simpler than the UAIC matrix assembly process. While saving the UAIC submatrices, the finite element models of each store including the grid locations, connectivity and material properties are also saved on the database. For a given aircraft/store configuration, the MSM system retrieves all the store finite element models from the database and attaches them to the aircraft finite element model, then subsequently launches a finite element analysis. The output of this analysis will be directly imported to the ZAERO/3-D spline module for an aeroelastic analysis.

2.2.4 Design of a Database for the MSM System

The ZAERO/ZDM module (ZONA Dynamic Memory and database management system) will be adopted as the basic database management system for the MSM system. Among many other features, the ZDM has two data entity managers that are especially important to the efficiency of the MSM system.

Matrix Entity Manager

The matrix entity manager is designed to store and retrieve very large, often sparse, matrices. It minimizes disk storage requirements while allowing algorithms to be developed that can perform matrix operations of virtually unlimited size.

Relational Entity Manager

Relational entities are essentially tables. Each relation has data stored in rows (called entries) and columns (called attributes). Each attribute is given a descriptive name, a data type, and constraints on the values that the attributes may assume (i.e., integer, real or character data). These definitions are referred to as the schema of the relation.

Clearly, the minimum disk storage capability of the matrix entity manager not only increases the efficiency of saving and retrieving matrices, but also reduces the required disk size of the computer.

The relational entity manager can be used as a file system manager. For instance, the "*store label*" can be defined as an attribute in a relational data entity. The data addresses in the database of the UAIC matrices and the finite element models can be stored in other attributes. Once the relational data entity is established, the data address of each store in the database can rapidly be located and subsequently retrieved by the matrix entity manager.

SECTION 3

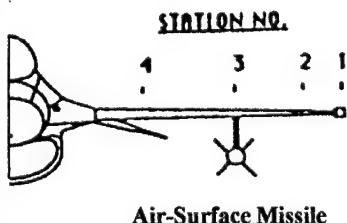
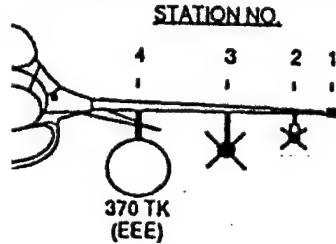
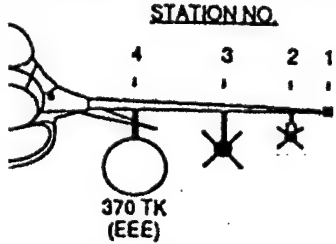
SELECTED TEST CASE DATA

3.1 Flight Test Data

Three F-16 with store configurations adopted from Ref 1 are selected as the test cases of the proposed software system. Reference 1 described that the aircraft is an F-16A, tail number 80-0573. This aircraft is a Block 15 F-16 modified for flutter testing. The store configurations and their associated F-16 weapon-carriage stations are presented in Table 3.1. A more detailed store mass properties and store attachment reference points are given in Tables 3.2 and 3.3. These data are taken from Ref 1 and used in the present work as the basis for modeling the structural finite element data and aerodynamic panel of the three configurations.

According to Ref 1, the three store configurations experienced different aeroelastic instabilities in flight tests; classified by Ref 1 as classical flutter, typical LCO and non-typical LCO. The measured flight test response for these cases are given in Figs 3.1-3.3. These data are also adopted from Ref 1 and used in the present work to correlate the numerical predictions with the flight test data. Because of their distinct aeroelastic instabilities, these three store configurations are the ideal test cases of the present procedure.

Table 3.1 Store Configurations.

Sta. No.	Aeroelastic Response Type		
	Case 1 Classical Flutter	Case 2 Typical LCO	Case 3 Non-typical LCO
1	LAU-129/A launcher	LAU-129/A launcher	16S210 launcher
2	Empty Station	LAU-129/A launcher AIM-9L missile	LAU-129/A launcher AIM-9L missile
3	Launcher/pylon Air-surface missile	Launcher/pylon Air-surface missile	Launcher/pylon AIM-120A missile
4	Empty Station	Pylon 370-gal fuel tank (empty)	Pylon 370-gal fuel tank (empty)
Front View	 <p style="text-align: center;">Air-Surface Missile</p>	 <p style="text-align: center;">370 TK (EEE)</p>	 <p style="text-align: center;">370 TK (EEE)</p>

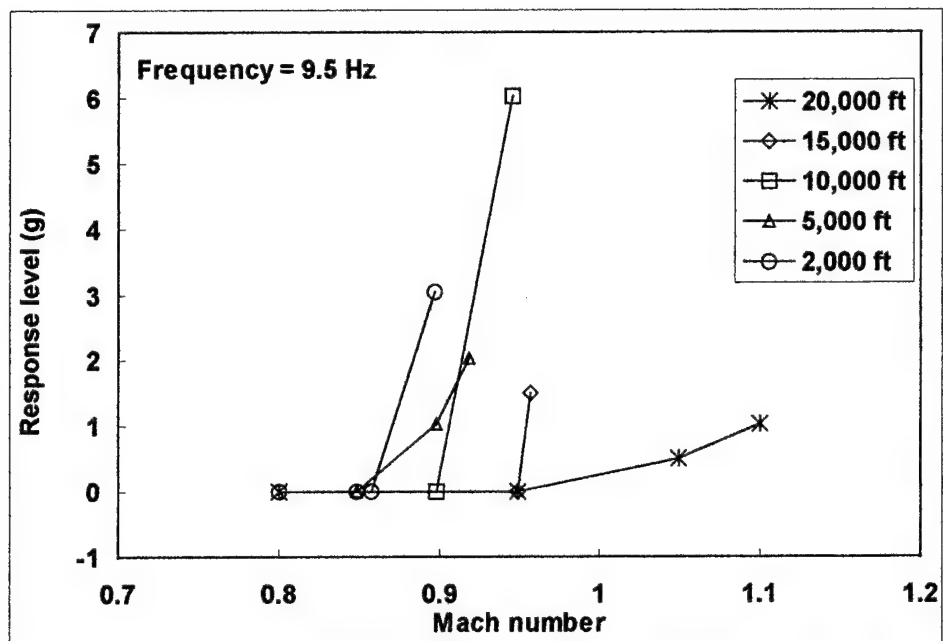


Figure 3.1 Measured Oscillatory Wingtip Response of Flight Test for Classical Flutter Configuration.

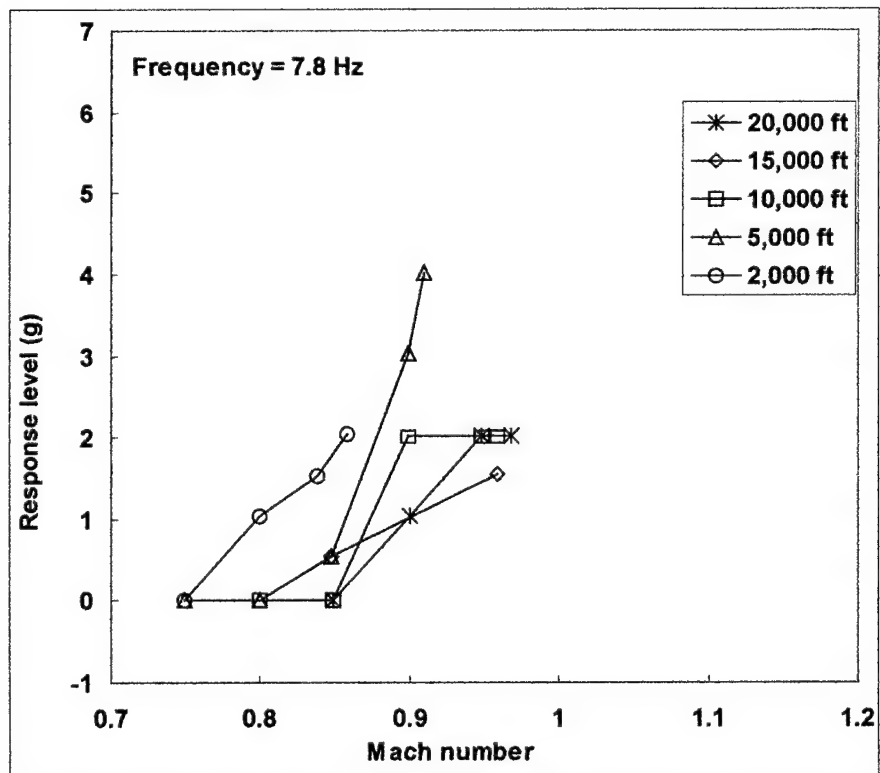


Figure 3.2 Measured Oscillatory Wing Tip Response of Flight Test for the Typical LCO Configuration.

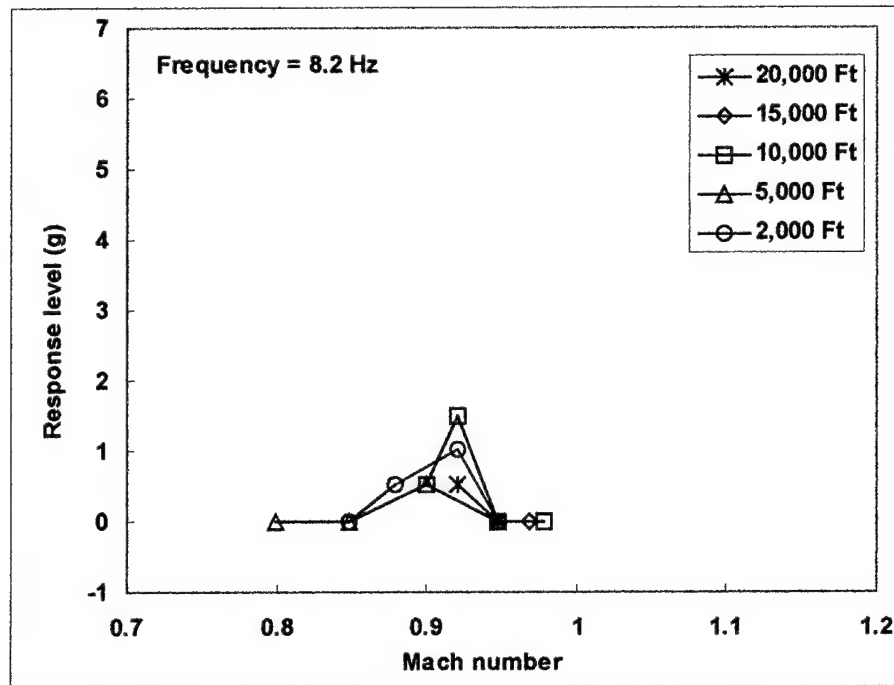


Figure 3.3 Measured Oscillatory Wing Tip Response of Flight Test for the Non-Typical LCO Configuration.

Table 3.2 Store Mass Properties (Taken from Reference 1).

Store	Weight t (lbs)	Center of Gravity			Moment of Inertia, slug ft ²		
		x, in	y, in	z, in	Roll	Pitch	Yaw
Air-surface missile	502.0	-14.58	0.00	-25.00	1.76	139.87	140.00
AIM-9L missile	200.0	-21.10	0.00	-17.50	0.42	51.00	51.00
AIM-120 missile	345.0	-14.73	0.00	-25.00	0.65	96.65	96.59
LAU-129/A wing tip launcher	88.0	-13.72	2.88	0.00	-	13.86	13.86
LAU-129/A underwing launcher	88.0	-13.72	0.00	-14.50	-	13.86	13.86
16S210 wingtip launcher	69.0	-15.28	3.60	0.00	-	11.68	11.68
Launcher/Pylon	138.0	-3.60	0.00	-11.00	1.46	14.35	13.55
370-gal fuel tank (empty)	438.5	-8.37	0.00	-18.22	17.12	176.11	165.69

Table 3.3. Store Attachment Reference Points (Taken from Reference 1)

Station	Location	Type	x, in	y, in	z, in
1	Wing Tip	Missile	380.46	180	0
2	Underwing	Missile	375.72	157	0
3	Underwing	Weapon	349.67	120	0
4	Underwing	Fuel Tank	325.40	71	0

3.2 Overall Computational Strategy

To investigate the influence of store configurations on the aeroelastic instability and, more importantly, to study the differences between the classical flutter, typical LCO and non-typical LCO, a number of aeroelastic instability analysis were conducted in the present work as follows:

- (1) Three structural finite element models of the F16/store as described in Table 3.1 are used.
- (2) For each of the three cases above, three aerodynamic models were used including the wing with tip launcher, the whole aircraft without store, and the whole aircraft with stores.
- (3) Two flutter calculation procedures were conducted using linear and nonlinear unsteady aerodynamic methods.
- (4) The calculations were performed to two structural dynamic models: the structural models with and without rigid body modes.
- (5) The flutter results were presented based on two structural damping assumptions : $g = 0\%$ and $g=1.0 \%$.
- (6) To investigate the correlation of the flutter calculations with the flight test data, the flutter results were presented for five altitudes, including sea level, 5 kft, 10 kft, 15 kft, and 20 kft.

3.3 Structural Finite Element Data

The structural finite element model for each of the three cases is shown in Fig 3.4. Symmetric modes were not considered in the present analysis since the it was known from the flight test results that the actual instability were anti-symmetric. However, the computational codes, including MSC/NASTRAN and ZAERO, are applicable to a more general case, *i.e.* symmetric, anti-symmetric and asymmetric configurations.

The natural frequencies for the whole aircraft with stores of each case are given in Table 3.2. The NASTRAN data needed to generate the natural frequencies and mode shapes are given in Appendices A, B, and C for the classical flutter, typical LCO and non-typical LCO cases, respectively. These natural frequencies and mode shapes are used in the present flutter/LCO predictions as described in the next three sections.

Table 3.4 Natural Frequencies of F-16A (with Rigid Body Modes).

Mode Shape	Natural frequency (Hz)		
	Case 1 Classical Flutter	Case 2 Typical LCO	Case 3 Non-typical LCO
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	9.01	7.74	8.16
5	9.91	8.10	8.36
6	12.03	9.77	10.71
7	12.20	10.93	11.58
8	13.61	11.97	12.60
9	15.69	12.42	13.99
10	17.41	13.74	14.84
11	20.71	15.19	15.52
12	29.59	17.23	17.70
13	29.76	19.53	19.90
14	33.94	22.19	22.44
15	36.45	24.00	23.93
16	39.68	26.09	26.60
17	41.79	29.75	29.96
18	44.05	30.55	31.72
19	44.92	31.58	32.36

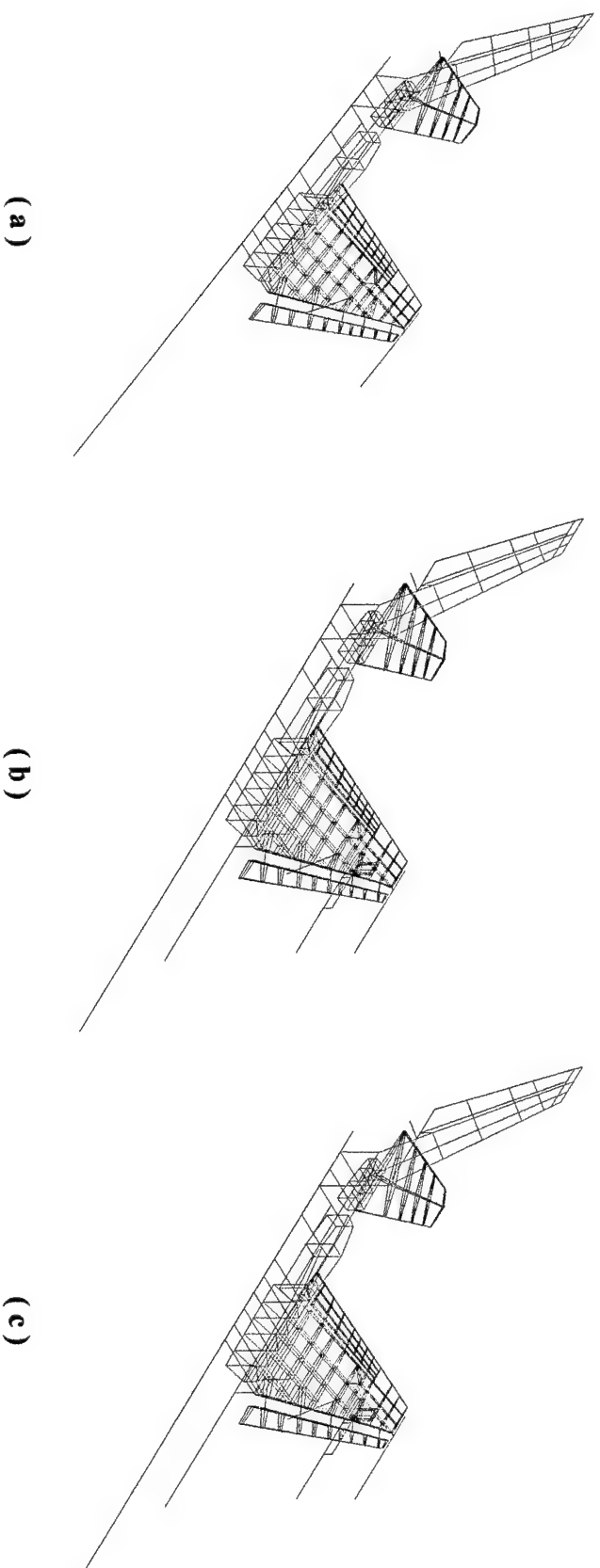


Figure 3.4 Finite Element Model of F16A – (a) Classical Flutter Case (b) Typical LCO Case, (c) Non-typical LCO Case.

3.4 Aerodynamic Model

Three aerodynamic models (Figure 3.5) are generated for each of the three F16/store configurations as follows:

- Model 1 : Wing with tip launcher only
- Model 2 : Whole aircraft without under stores
- Model 3 : Whole aircraft with stores.

The aerodynamic influence coefficient is calculated based on two different methods: linear and nonlinear unsteady aerodynamics. The linear aerodynamic methods are ZONA6 and ZONA7 for subsonic and supersonic flows, respectively. The nonlinear aerodynamic method is ZONA Transonic Aerodynamic Influence Coefficient (ZTAIC) method. These three aerodynamic codes are the essential parts of ZAERO to generate the AIC of the whole configurations, including fuselage, wing, empennage and stores.

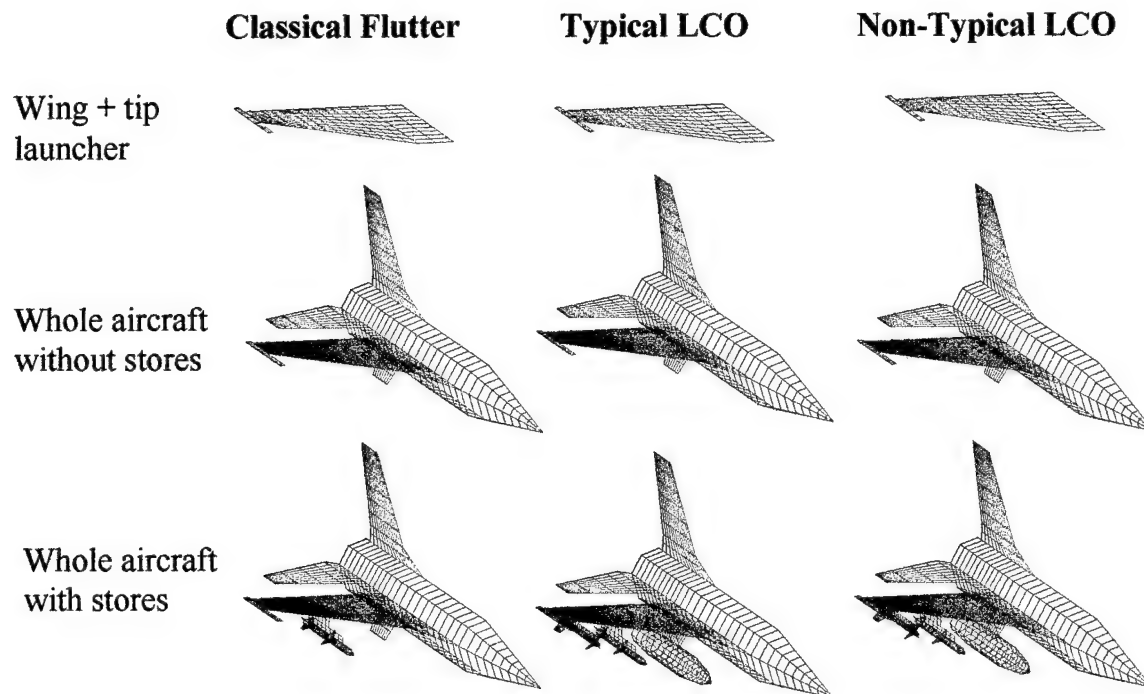


Figure 3.5 Aerodynamic Models of F-16/Store

3.5 Steady Transonic Aerodynamic Data

The steady transonic aerodynamic data in the present work was supplied by Denegri of Eglin Air Force Base for five Mach numbers, including $M = 0.8, 0.90, 0.95, 0.98$, and 1.05 . The pressure distribution for the wing lower and upper surfaces of each Mach number are shown in Figure 3.6.

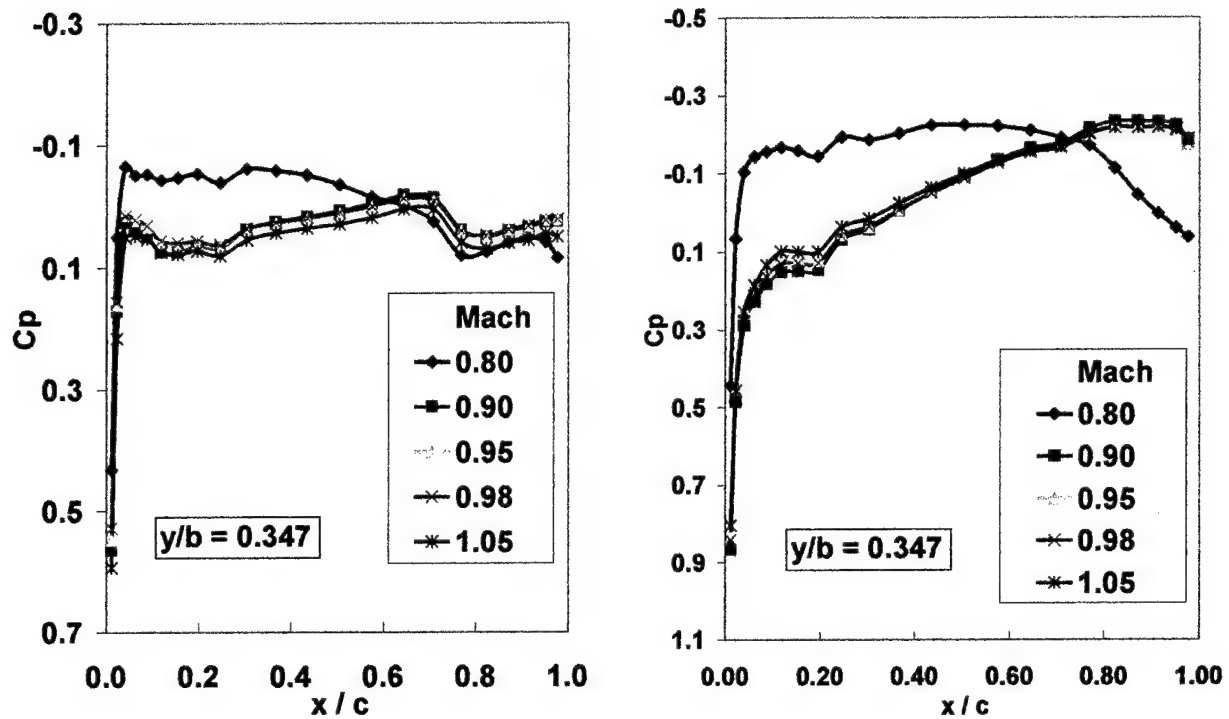


Figure 3.6a C_p Distribution at $y = 0.347 b$.

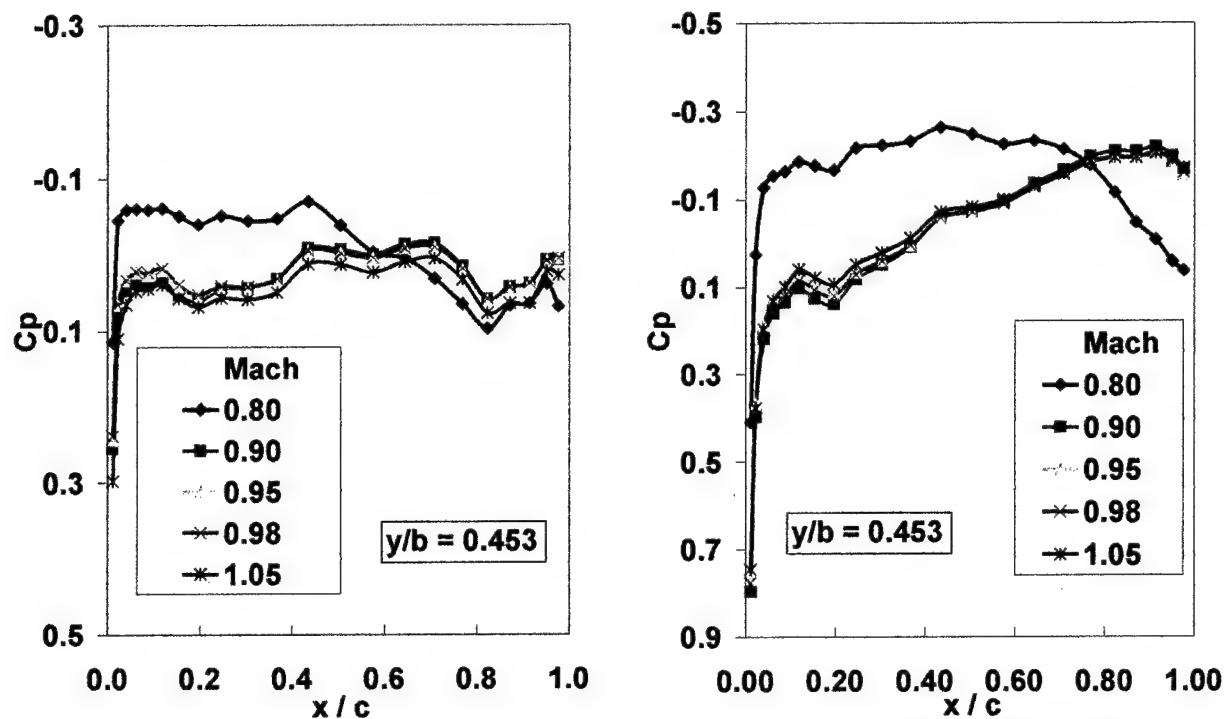


Figure 3.6b C_p Distribution at $y = 0.453 b$.

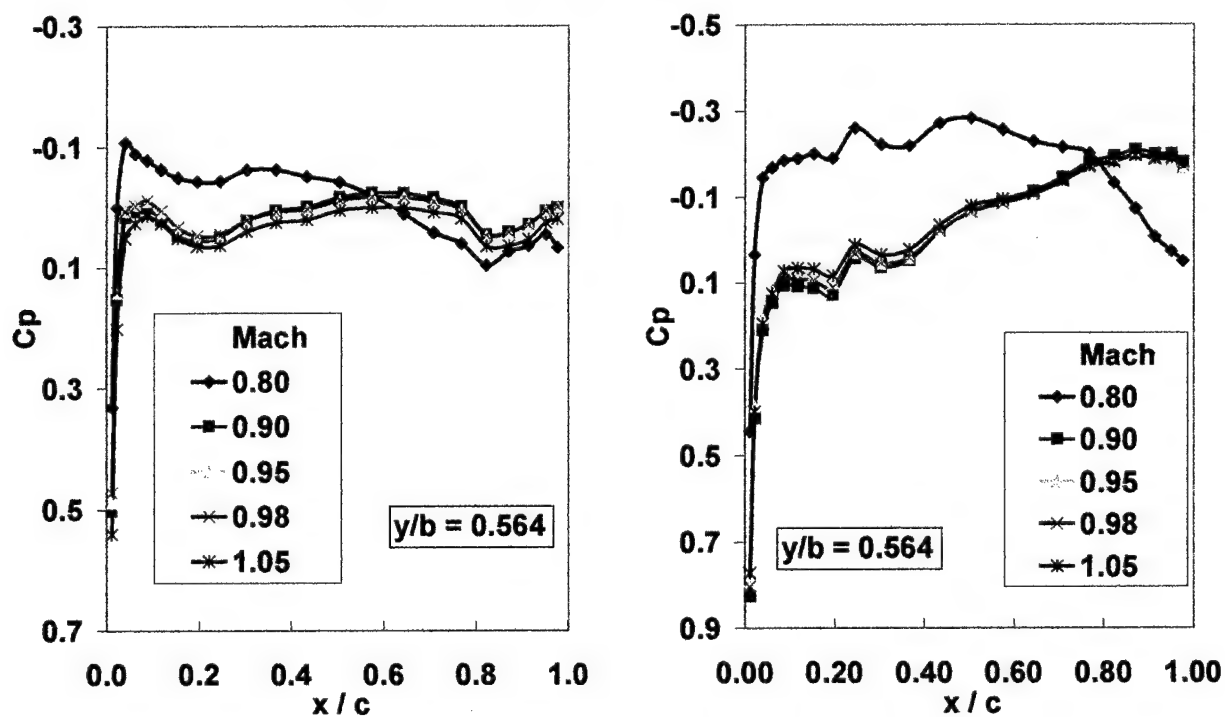


Figure 3.6c C_p Distribution at $y = 0.564 b$.

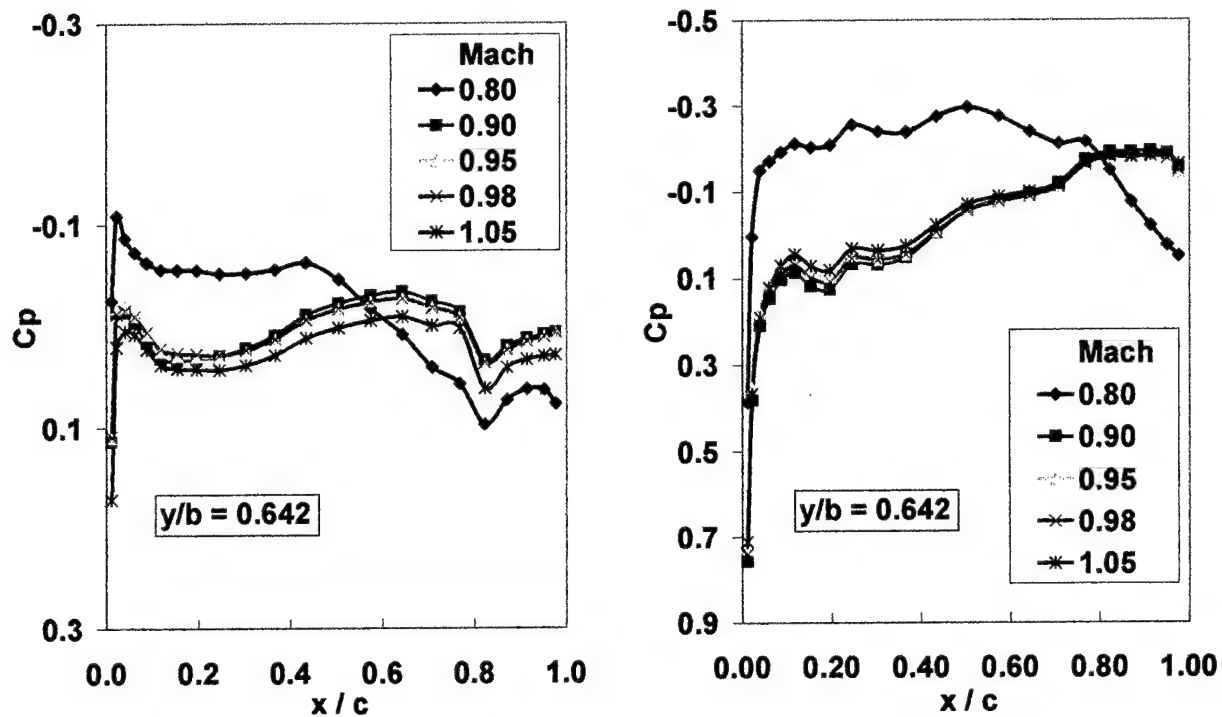


Figure 3.6d C_p Distribution at $y = 0.642 b$.

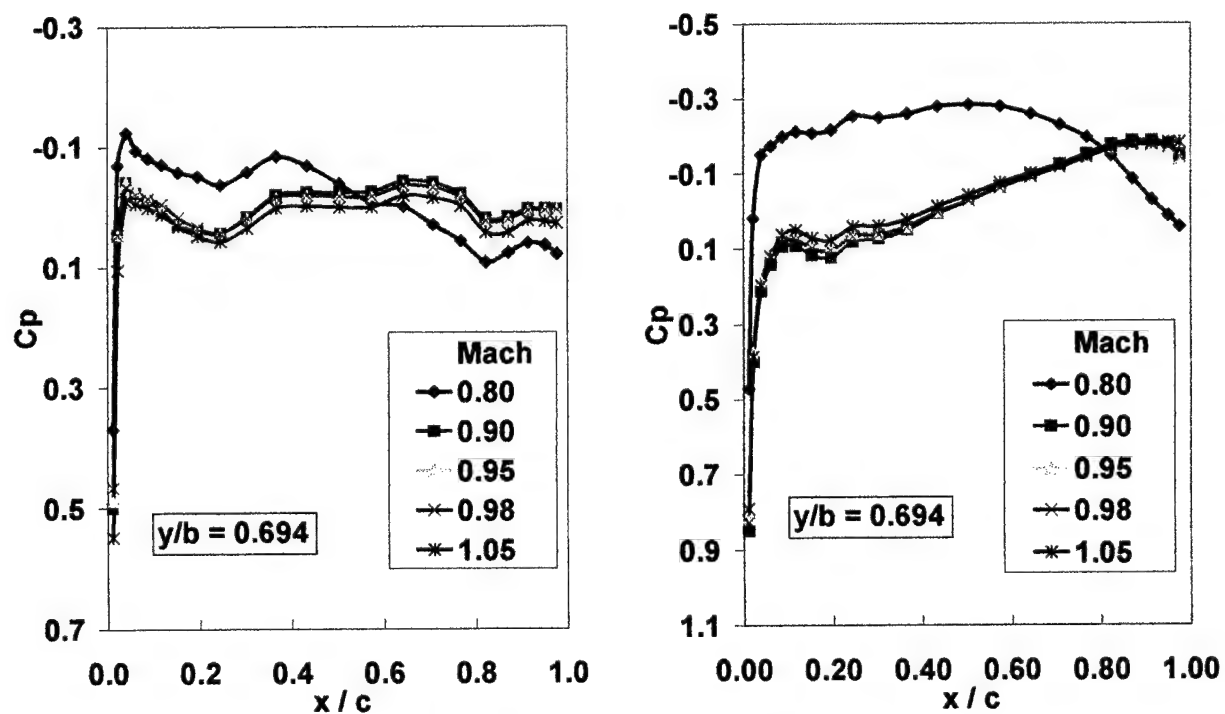


Figure 3.6e C_p Distribution at $y = 0.694 b$.

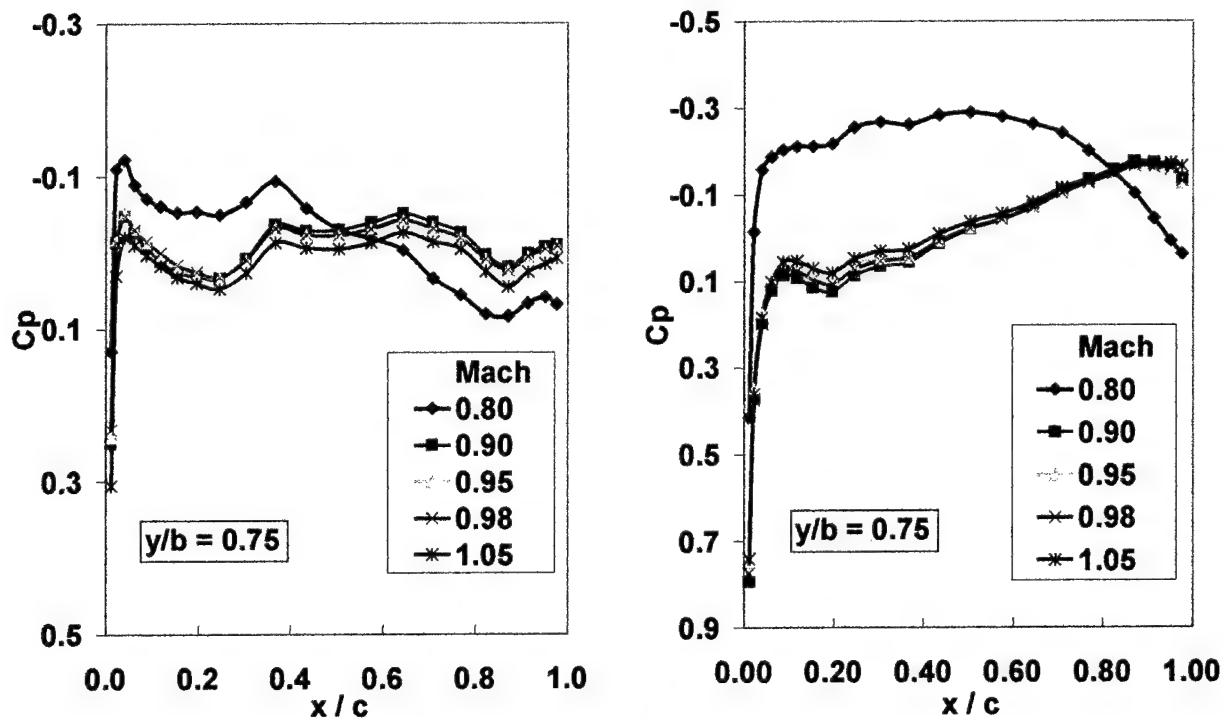


Figure 3.6f C_p Distribution at $y = 0.75 b$.

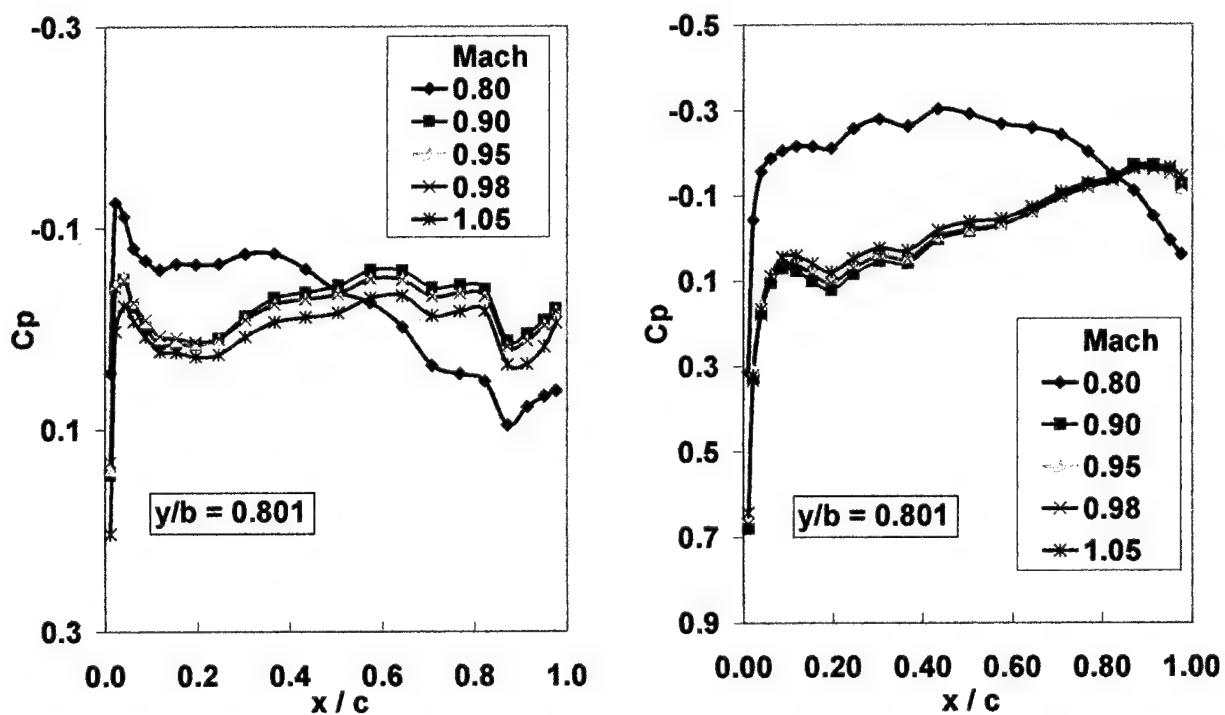


Figure 3.6g C_p Distribution at $y = 0.801 b$.

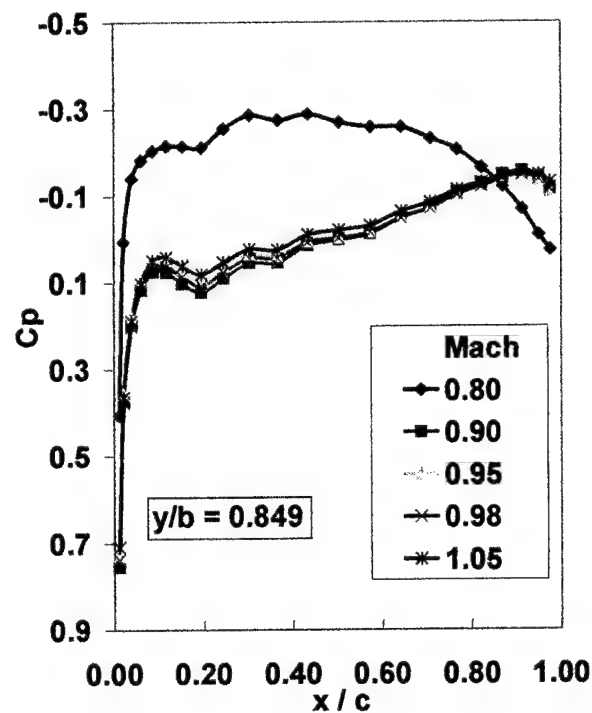
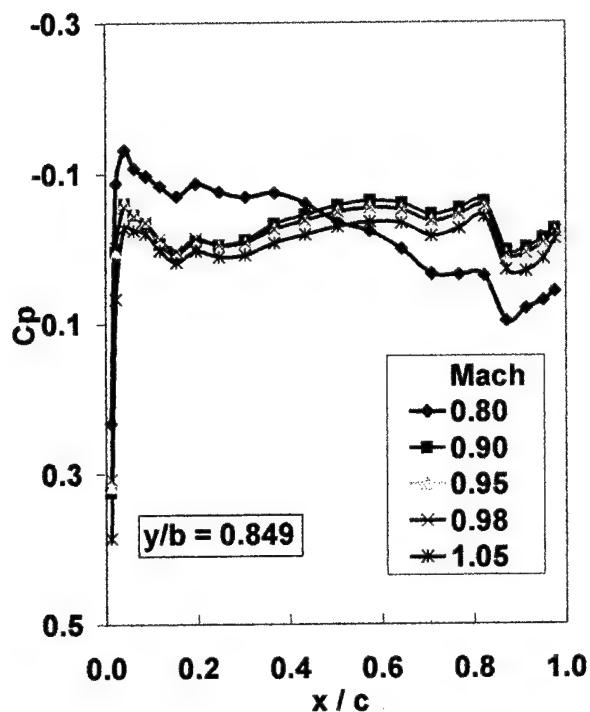


Figure 3.6h C_p Distribution at $y = 0.849 b$.

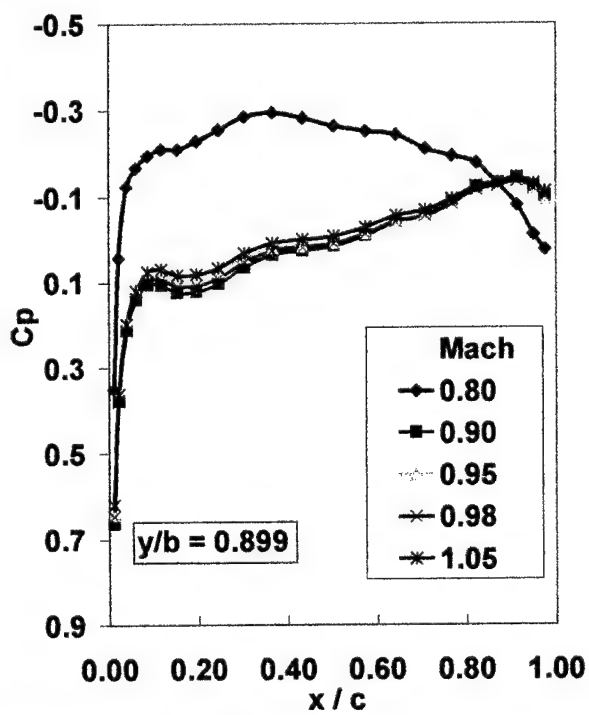
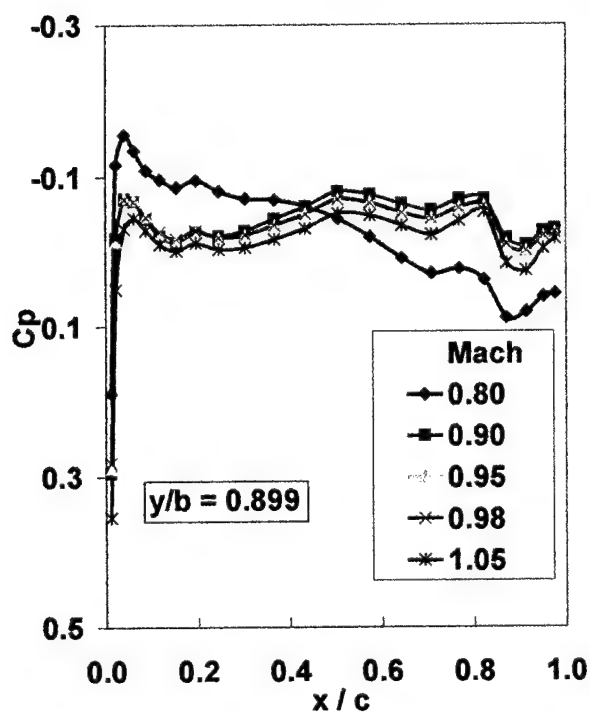


Figure 3.6i C_p Distribution at $y = 0.899$.

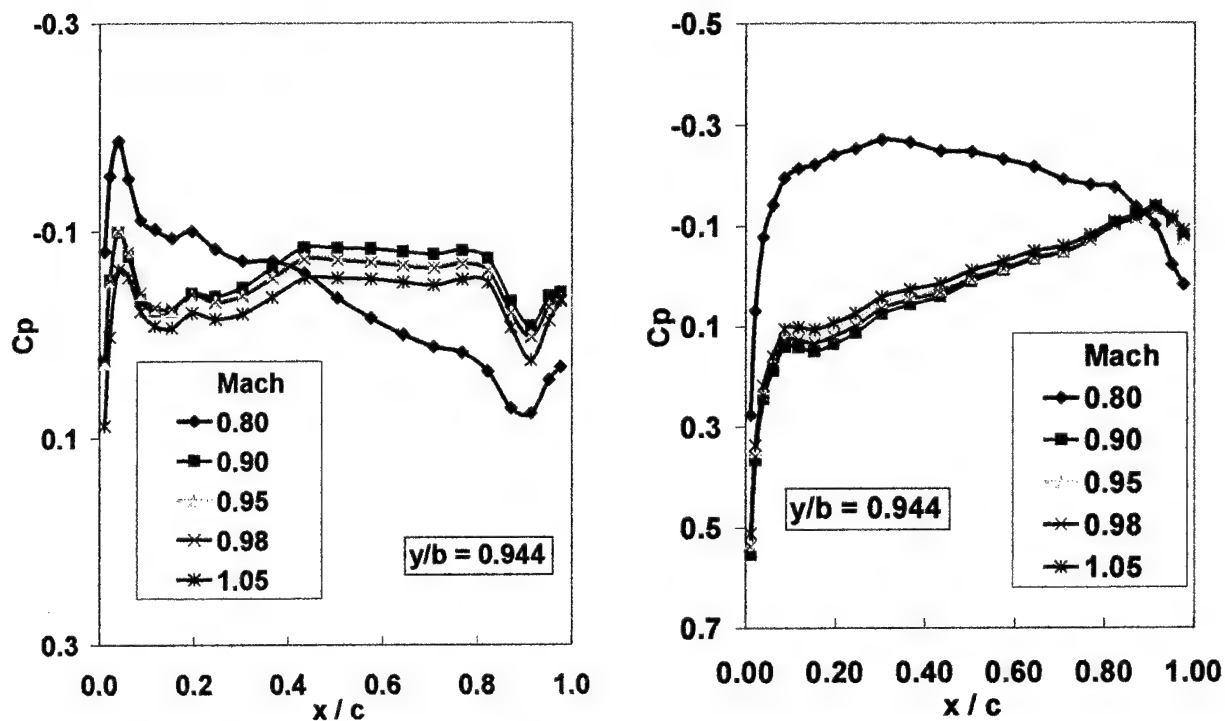


Figure 3.6j C_p Distribution at $y = 0.944$ b.

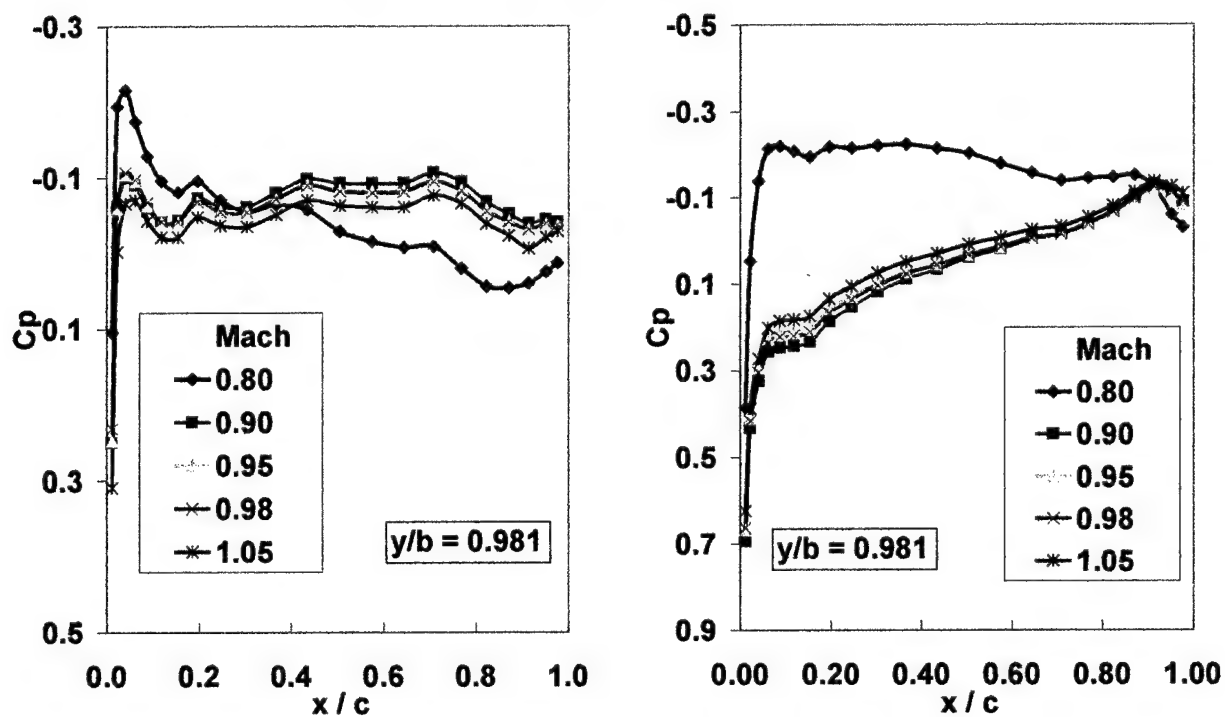


Figure 3.6k C_p Distribution at $y = 0.981$ b.

SECTION 4

CORRELATION OF THE F-16 / STORE CLASSICAL FLUTTER PREDICTIONS WITH FLIGHT TEST DATA

4.1 Flight Test Result and Previous Numerical Prediction

Reference 1 described that a classical flutter instability occurred during the flight test of F-16 with the air-surface missiles at Station 3 and LAU-129/A launcher at the wing tip (Figure 3.1). The instability response was characterized by a sudden onset of high-amplitude wing oscillations. The measured oscillatory wing tip response during level flight at five altitude is shown in Fig 3.1. At 10,000 ft altitude and level flight, no significant structural responses occurred between Mach 0.80 and 0.90, but a rapid onset of high amplitude anti-symmetric oscillations was encountered at Mach 0.95 and frequency of 9.5 Hz. Similar behavior was observed for other test altitudes.

An attempt to predict this classical flutter case has been conducted by Denegri in Refs 1 and 18. The calculation was performed at $M = 0.90$. The aerodynamic model used in Ref 1 and 18 is an isolated wing with tip launcher only, *i.e.* the same as the aerodynamic model #1 of the present work as shown in Fig 4.1. No aerodynamic modeling of fuselage, empenage and underwing stores is included. The only influence of the fuselage, empenage and stores considered in the flutter analysis is their effect on structural modal characteristics. The flutter calculation was conducted using the non-matched method. Two critical speed were found in the calculations. The first critical speed and frequency are $V_f = 442$ KCAS and $f_f = 10.17$ Hz with a hump-mode type of flutter mode. The second critical speed is at $V_f = 745$ KCAS and $f_f = 9.37$ Hz with an explosive type of flutter mode (Ref 18). The result indicates that the flight test frequency is well correlated with the second flutter mode frequency. However, the calculated flutter speed was higher than the flight test data.

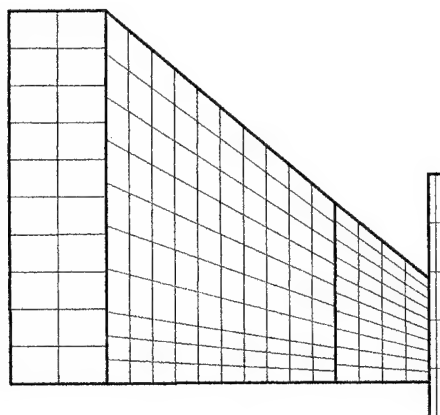


Figure 4.1 Aerodynamic Model #1 for the Classical Flutter Case.

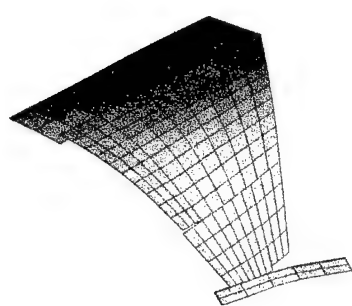
4.2. Linear Aerodynamic Approach

4.2.1 Aerodynamic Model #1

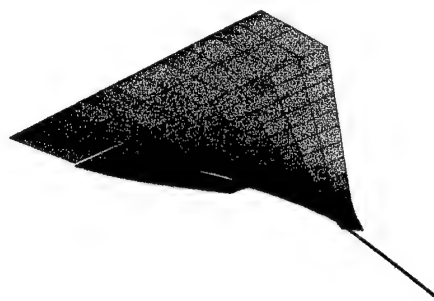
The first aerodynamic model of the present work is the isolated wing with tip launcher (Figure 4.1), *i.e.* the same as the model used in Ref 1. Figure 4.2 shows the first four natural (undamped) mode shapes. Employing a non-matched point flutter analysis of ZAERO at $M=0.90$ and sea level density, the first critical speed was found to be $V_f=456$ KCAS and flutter frequency was $f_f=10.17$ Hz (dominated by the third structural mode), and the second flutter speed/frequency was $V_f=752$ KCAS / $f_f=9.36$ Hz (dominated by the first structural mode). These results are very close to the analysis results in Refs 1 and 18 as shown in Table 4.1 and Fig 4.3. Figure 4.4 shows the flutter mode shape for $V_f=752$ KCAS at several time steps. The V-g and V-f plots of the present flutter analysis given in Fig 4.4 show similar results to Fig 12 of Ref 1. Note that Refs 1 and 2 used different numerical procedures for computing the unsteady aerodynamics, *i.e.* a doublet-lattice method for the unsteady aerodynamic prediction and a Laguerre variation of the classical K-method for the flutter solution.

Table 4.1 Flutter Results Using Linear Aerodynamics at $M=0.9$.

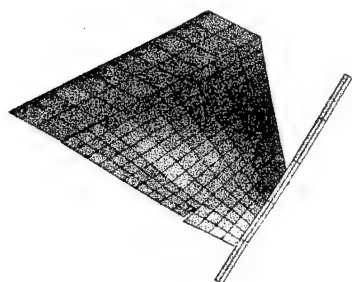
Aerodynamic Model or Methods		Flutter Speed (KCAS)	Flutter Frequency (Hz)
Flight test (on set of flutter speed)		585.4	9.5
Denegri's DLM results (Aerodynamic Model #1: Wing + tip launcher only, non matched point)	$g=0\%$	745	9.37
	$g=1\%$	807	9.39
Aerodynamic Model #1: Wing + tip launcher only, (non matched point)	$g=0\%$	752	9.36
	$g=1\%$	831	9.36
Aerodynamic Model #2: Whole aircraft without underwing stores (matched point)	$g=0\%$	483	9.56
	$g=1\%$	517	9.55
Aerodynamic Model #3: Whole aircraft with stores (matched point)	$g=0\%$	478	9.57
	$g=1\%$	513	9.55
Aerodynamic Model #3: Whole aircraft with stores but without rigid body modes (matched point)	$g=0\%$	486	9.56
	$g=1\%$	522	9.55



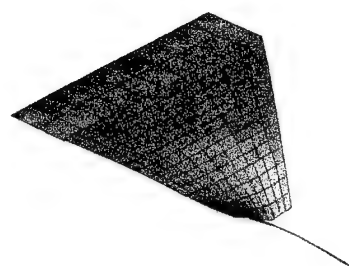
Mode 1 (9.19 Hz)



Mode 2 (9.96 Hz)



Mode 3 (10.25 Hz)



Mode 4 (12.39 Hz)

Figure 4.2 Vibration Modes of Aerodynamic Model #1.

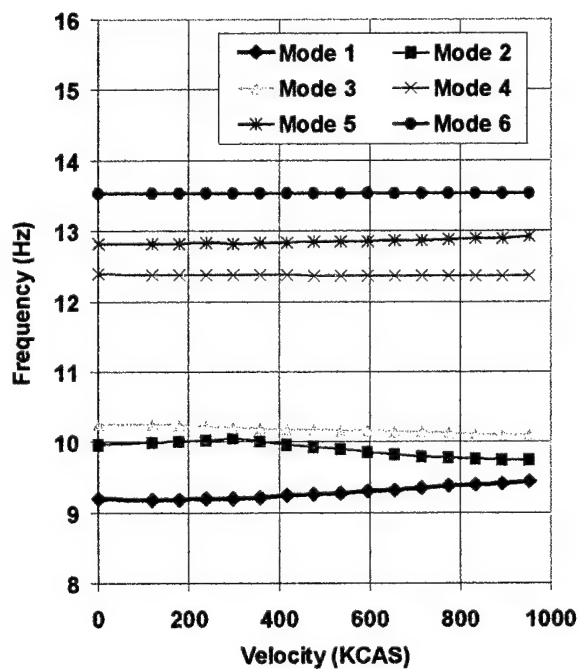
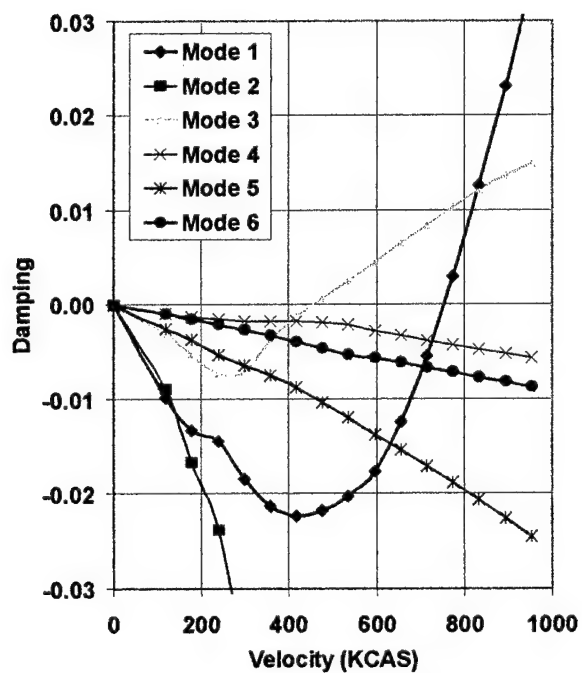


Figure 4.3 The Flutter V-g and V-f plots for Wingtip Launcher only Model at M = 0.9 Using the Linear Aerodynamic Approach.

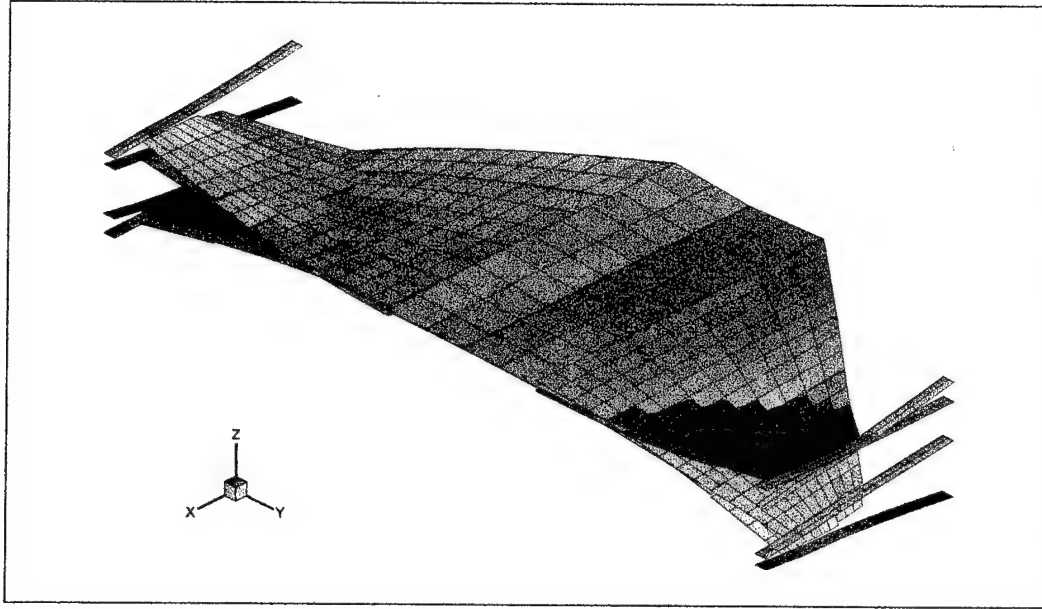


Figure 4.4 The Flutter Mode Shape at $V_f = 752$ KCAS and $f_f = 9.36$ Hz of the Wing-Tip Launcher Only Model.

4.2.2 Aerodynamic Model #2

The flutter calculation was repeated using the aerodynamic model #2, i.e. the whole aircraft without underwing stores. The flutter calculation using the matched point method gave the flutter speed/frequency at $V_f = 483$ KCAS / $f_f = 9.56$ Hz. Note that there is no second critical speed in this second model. If the structural damping is assumed to be $g = 1.0\%$, then the flutter speed and frequency becomes $V_f = 517$ KCAS and $f_f = 9.55$ Hz. The result for this configuration shows that the inclusion of the fuselage and empennage aerodynamic model improves the result, i.e. closer to the flight test data.

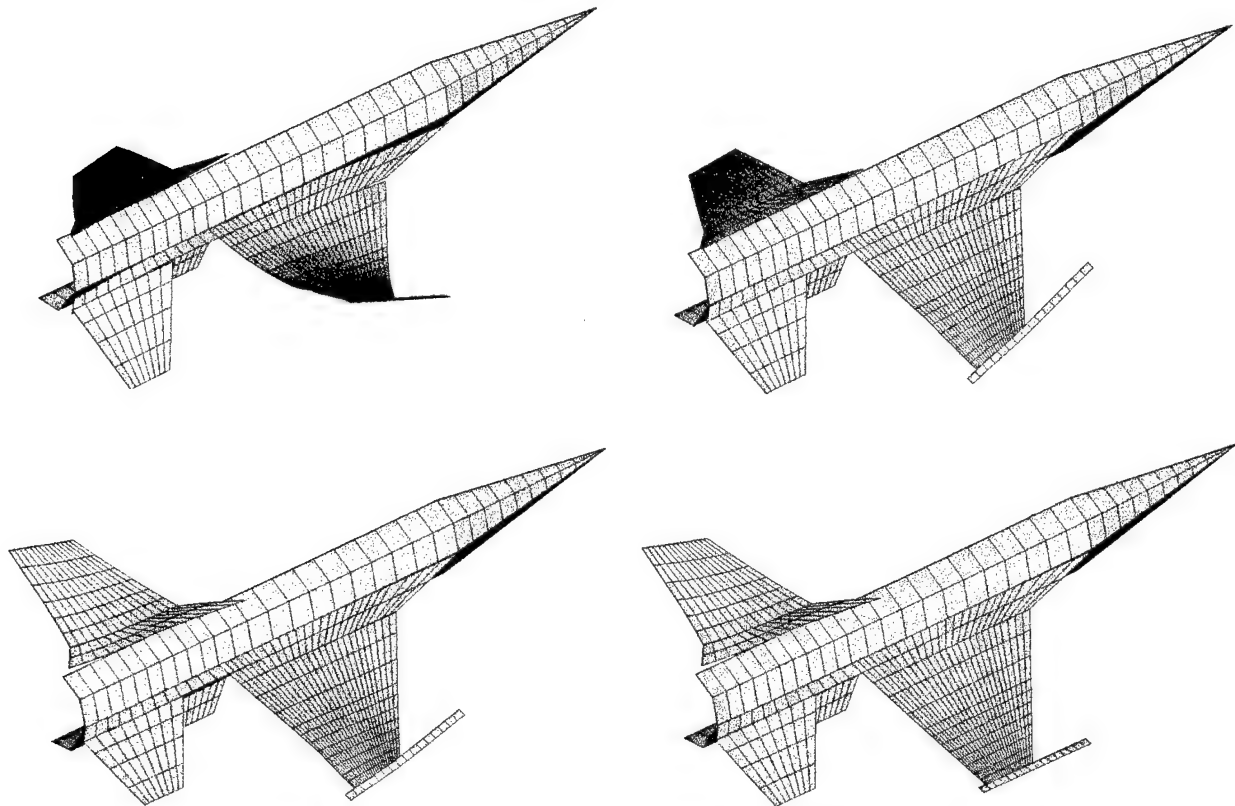


Figure 4.5 Vibration Modes of the Aircraft Model without Underwing Stores

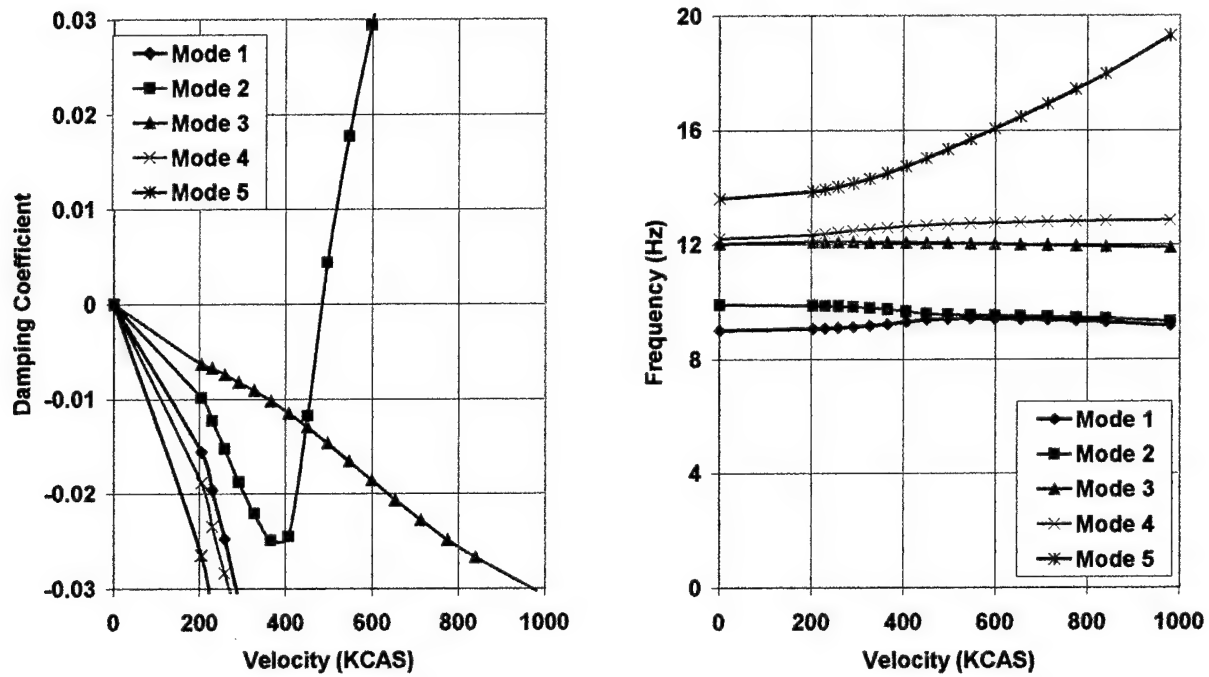


Figure 4.6 The Flutter V-g and V-f Plots for the Whole Aircraft Model without Underwing Stores at $M = 0.9$ Using the Linear Aerodynamic Approach.

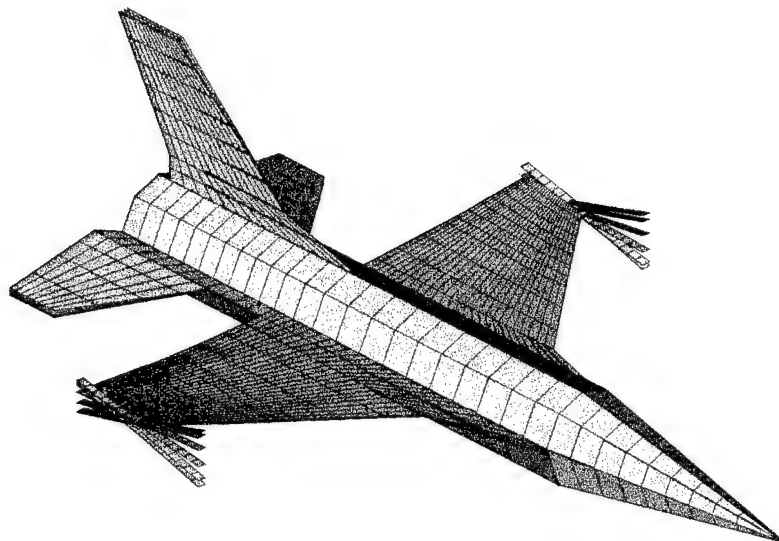


Figure 4.7 The Flutter Mode Shape of the Aircraft Model Without Underwing Stores.

4.2.3 Aerodynamic Model #3, $M = 0.90$

The flutter calculation was repeated using the aerodynamic model #3, i.e. the whole aircraft with underwing stores. The natural mode shapes are shown in Figure 4.8. The flutter calculation using the matched point method gave the flutter speed/frequency at $V_f = 486$ KCAS / $f_f = 9.56$ Hz. Note that there is no second critical speed in this third model. If the structural damping is assumed to be $g = 1.0\%$ than the flutter speed and frequency becomes $V_f = 522$ KCAS and $f_f = 9.55$ Hz. Clearly, the result for this configuration is closer to the flight test data as shown in Table 4.1.

All of the previous calculations on the classical flutter did not include the structural rigid body modes. If the anti-symmetric rigid body modes are included to the whole aircraft with store model, the similar procedures gave the flutter speed / frequency at $V_f = 478$ KCAS / $f_f = 9.57$ Hz for $g=0\%$, and $V_f = 513$ KCAS / $f_f = 9.55$ Hz for $g = 1.0\%$. These results are very close to the results of the model without rigid body modes. Therefore, for the classical flutter of the present case, the influence of the rigid body modes is not significant. Figure 4.9 shows the flutter V-g and V-f diagrams for aerodynamic model #3. The flutter modes for several time steps is presented in Fig 4.10.

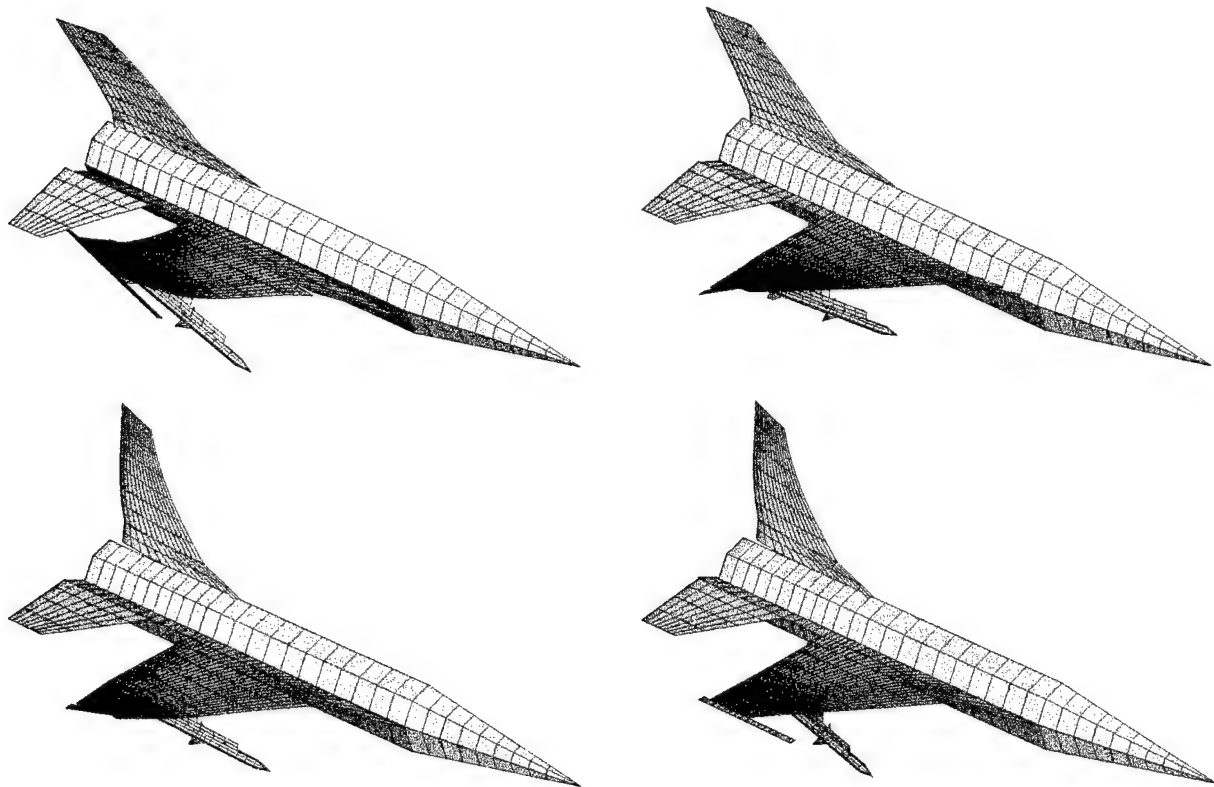


Figure 4.8 Vibration Modes of the Aircraft Model with Underwing Stores

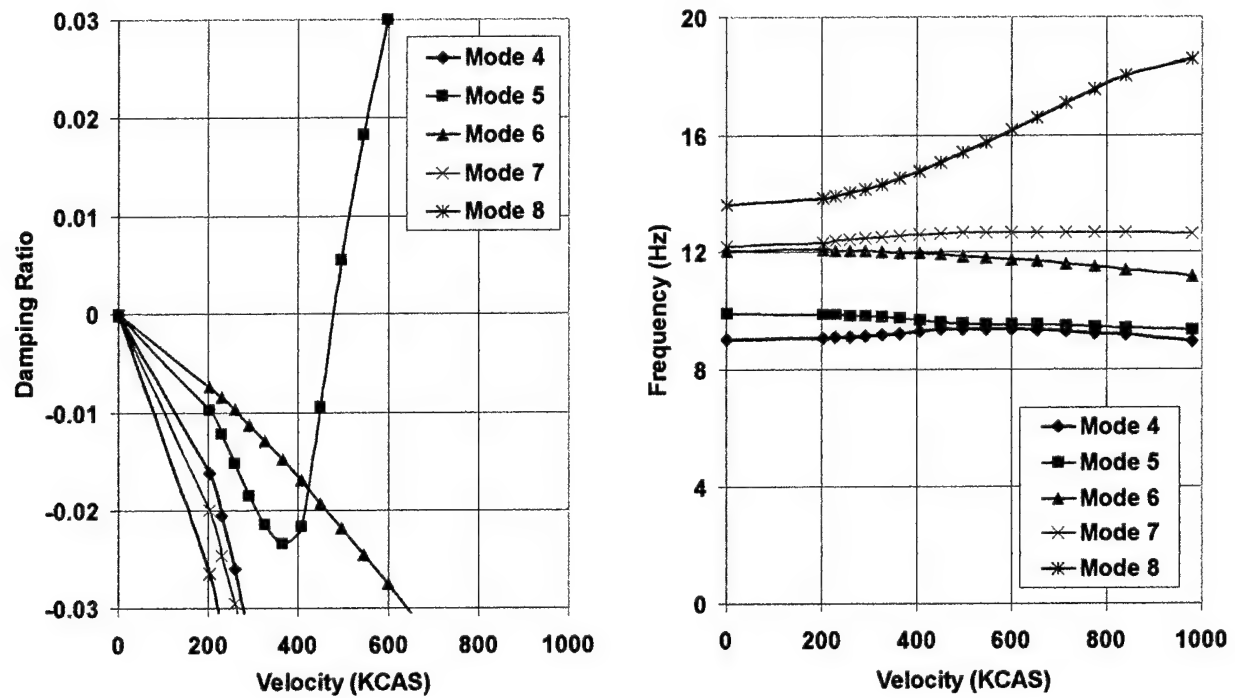


Figure 4.9 The Flutter V-g and V-f plots of the Whole Aircraft Model with Underwing Stores at $M = 0.9$ using the Linear Aerodynamic Approach.

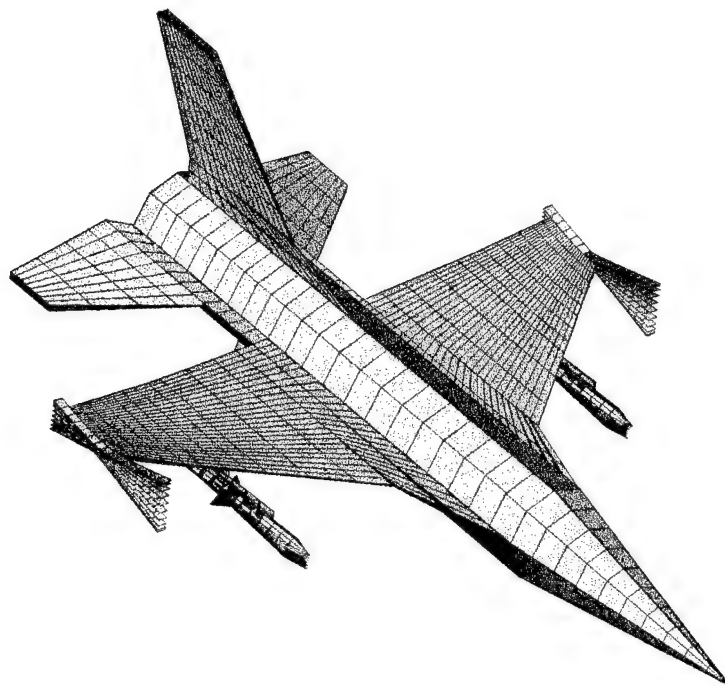


Figure 4.10 The Flutter Mode Shape of the Whole Aircraft Model with Underwing Stores at $M = 0.9$.

4.2.4. Aerodynamic Model #3. Mach 0.8 – 1.05

The flutter calculations for $M = 0.90$ showed improvement on the solution results if a more refined aerodynamic model is used. However, previous results does not give a direct correlation between the flutter prediction and the flight test data. Note that, to indicate the flutter onset, the flight test data presents the measure acceleration response level in terms of Mach numbers and altitudes. Therefore, in order to correlate the numerical predictions with the flight test data, the calculation was repeated for several Mach numbers, including $M = 0.80, 0.90, 0.95, 0.98$, and 1.05 . The flutter solution is represented by the damping coefficient as a function of Mach number for each altitude as shown in Fig 4.11. Note that the correlation of the flutter prediction with the altitude is automatically generated by using the matched point option of the g-method.

The critical speed and frequency are given in Table 4.2. The results presented in Fig 4.11. shows that

- Linear aerodynamic approach (ZONA6/ZONA7) predicts explosive damping of the unstable mode in all altitudes.
- For the altitude lower than 15,000 ft, the flutter onset Mach number of the flight test data was correlated very well with the linear aerodynamic approach if the structural damping is assumed to be 1%.
- For altitudes of 15,000 ft and higher, the onset Mach number of the flight test data occurred near $M = 0.98$ and 1.02 where the nonlinearity effect of the transonic aerodynamic is significant. Therefore, the linear aerodynamic approach gives a higher prediction of the onset Mach number for these altitudes.

Table 4.2 Critical Speed and Frequency Using the Linear Aerodynamic Approach (ZONA6/ZONA7)

<i>Mach Number</i>	<i>Damping Coeff. g (%)</i>	<i>Flutter Speed (KCAS)</i>	<i>Flutter Frequency (Hz)</i>
0.80	0.0	485	9.58
	1.0	521	9.56
0.90	0.0	486	9.56
	1.0	522	9.55
0.95	0.0	479	9.56
	1.0	515	9.55
0.98	0.0	500	9.58
	1.0	556	9.58
1.05	0.0	490	9.58
	1.0	517	9.58

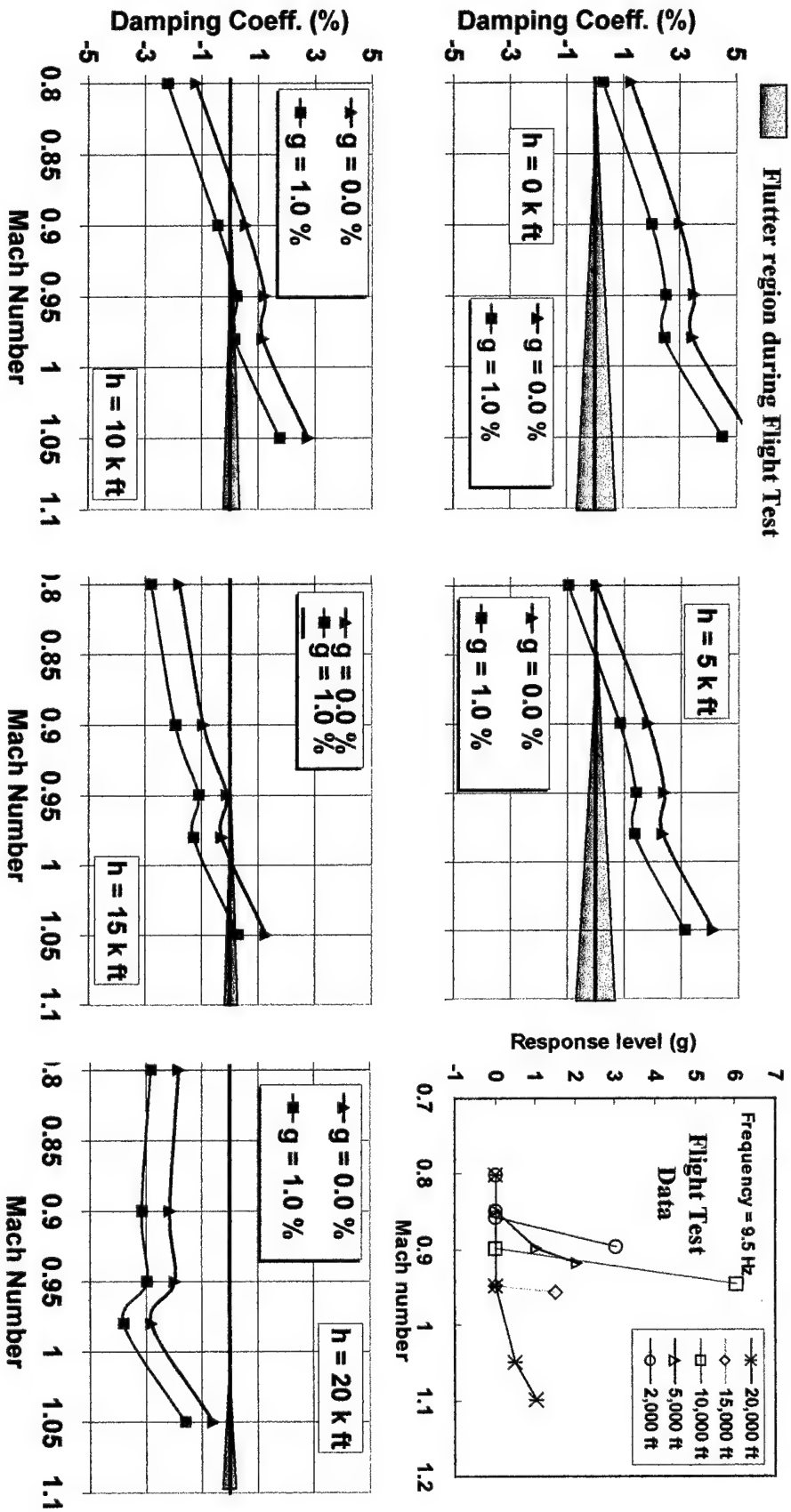


Fig 4.11 Correlation between the Flutter Prediction using the Linear Aerodynamic Approach (ZONA6/ZONA7) with Flight Test Data of the Classical Flutter Case.

4.3 Nonlinear Aerodynamic Approach

The flight test for the classical flutter configuration indicated that the aeroelastic instability for this case occurred between 0.85 and 1.1, *i.e.* in transonic regime where the nonlinear behavior of the aerodynamic flow may significantly influence the critical speed. To investigate the flutter calculation in this transonic regime, a nonlinear aerodynamic approach based on the ZTAIC method was used for the prediction of the unsteady aerodynamic data. The steady aerodynamic data was provided by Dr. Charles Denegri of Eglin Air Force Base as shown in Section 3. The flutter calculation was conducted for the whole aircraft with stores. Mach numbers ranged from 0.80 to 1.05. Rigid body modes were included in the structural dynamic calculations.

4.3.1 Aerodynamic Model #3 at $M = 0.90$

The flutter calculation for $M = 0.90$ using the matched point method gave the flutter speed/frequency at $V_f = 501$ KCAS / $f_f = 9.58$ Hz. Note that there is no second critical speed in this third model. If the structural damping is assumed to be $g = 1.0\%$, the flutter speed and frequency becomes $V_f = 538$ KCAS and $f_f = 9.56$ Hz. Compared to the results based on the linear aerodynamic approach given in Table 4.1, the present result using the nonlinear aerodynamic approach is closer to the flight test data. Figure 4.12 shows the V-g and V-f plot for Mach 0.90. The associated flutter mode is presented in Fig 4.13.

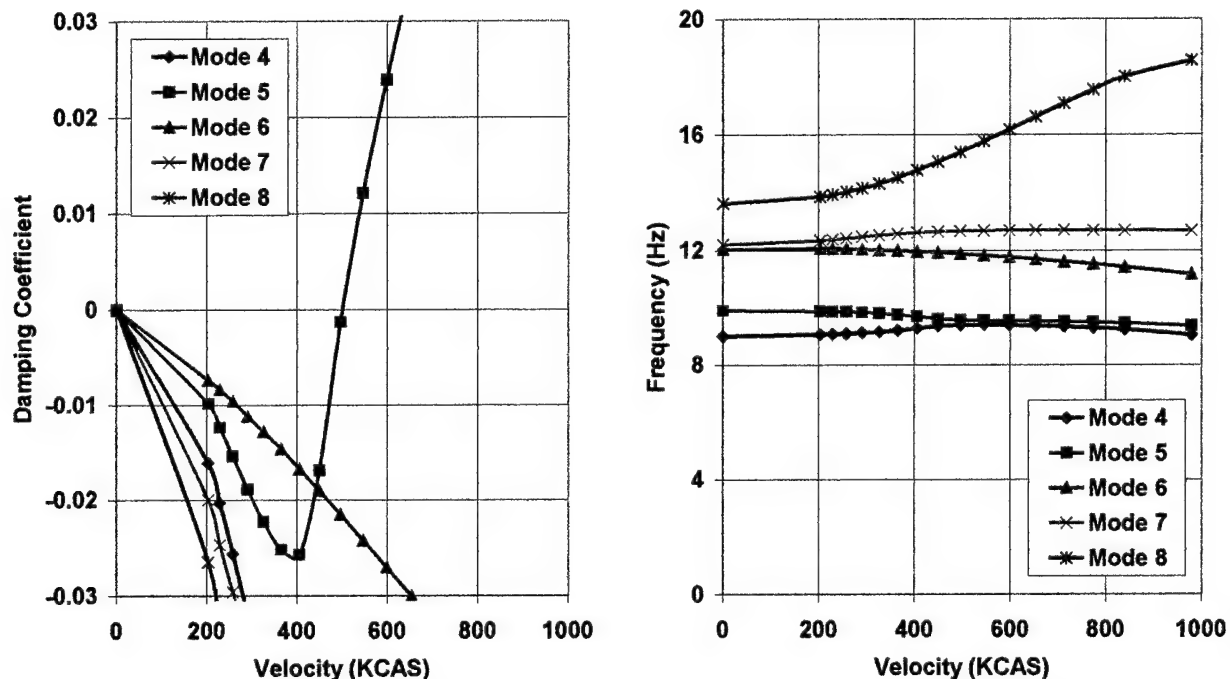


Figure 4.12 The Flutter V-g and V-f plots of the Whole Aircraft Model with Underwing Stores at $M = 0.9$ Using The Nonlinear Aerodynamic Approach.

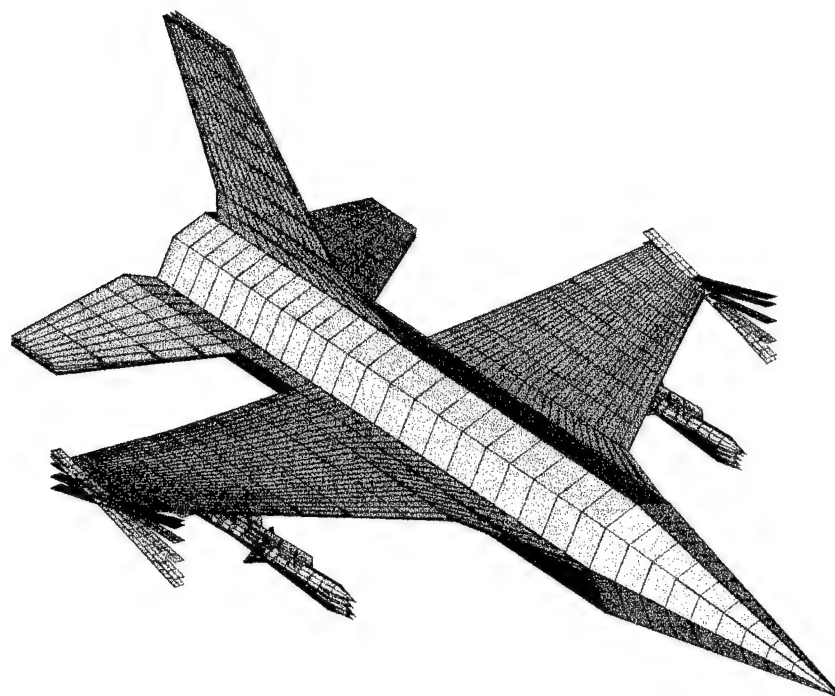


Figure 4.13 The Flutter Mode Shape of The Whole Aircraft Model with Underwing Stores at $M = 0.9$ Calculated Using The Non-Linear Aerodynamic Method.

4.3.2 Aerodynamic Model #3 at $M = 0.80 - 1.05$

In order to correlate the numerical predictions with the flight test data, the calculation for the nonlinear aerodynamic approach was repeated for several Mach numbers, namely $M = 0.80$, 0.90 , 0.95 , 0.98 , and 1.05 . The flutter solution is represented by the damping coefficient and Mach number as well as the altitudes. The critical speed and frequency for each Mach number are given in Table 4.3. The results presented in Fig 4.14. shows that:

- ZTAIC, i.e. the nonlinear aerodynamic approach, predicts explosive damping of the unstable mode in all altitudes.
- In the post-flutter region, the non-linearity induced stable damping (from either structures or aerodynamics) can not nullify the explosive unstable damping, leading to flutter.
- ZTAIC results indicate that the onset of flutter is very sensitive to the linear structural damping.
- Overall, ZTAIC predicts the flutter onset Mach number better than the linear aerodynamic approach for all altitudes.

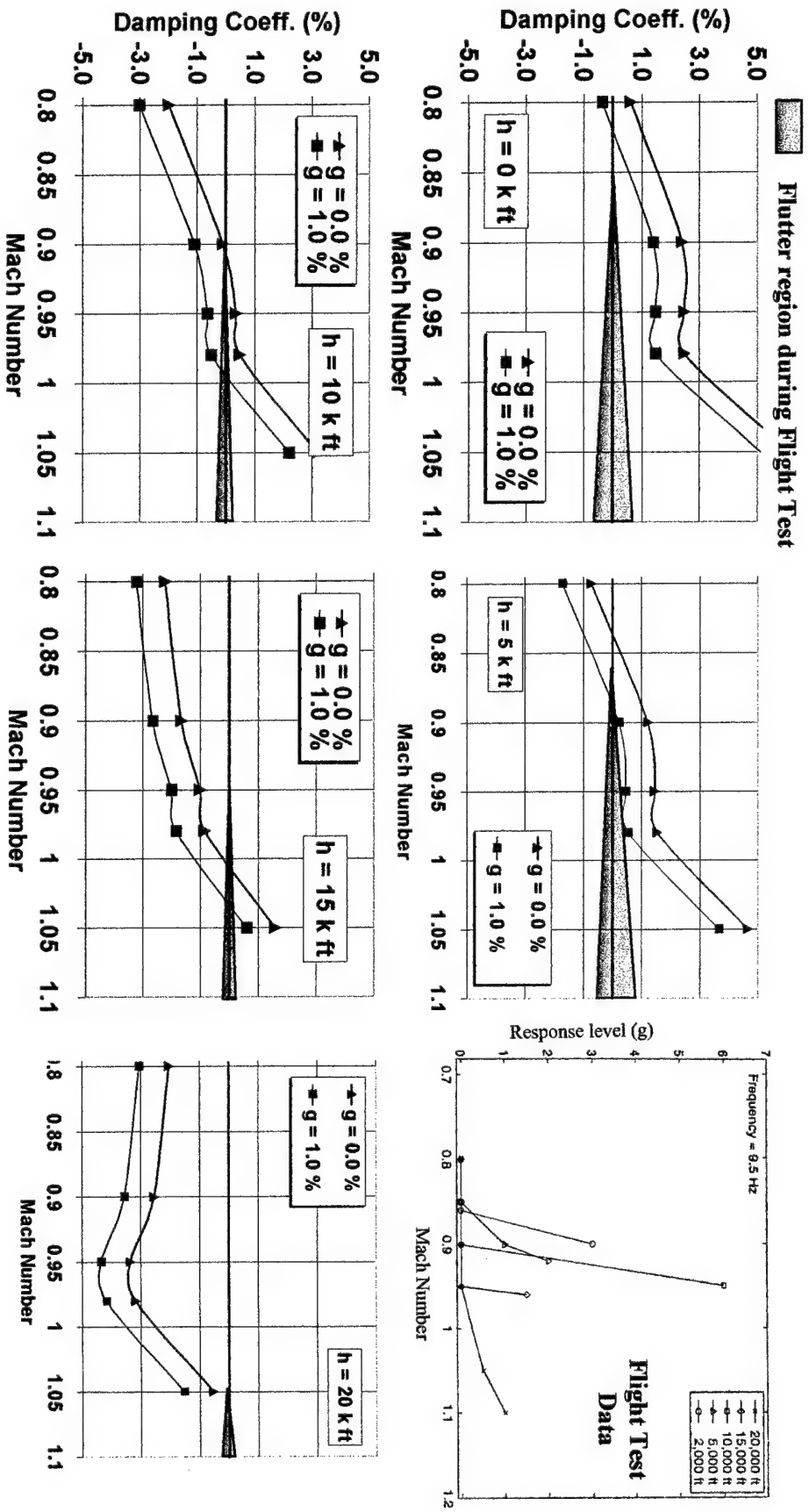


Figure 4.14 Correlation between the Flutter Prediction using the Nonlinear Aerodynamic Approach (ZTAIC) and the Flight Test Data.

Table 4.3 Critical speed and Frequency Using the Nonlinear Aerodynamic Approach (ZTAIC).

<i>Mach Number</i>	<i>Damping Coeff. g (%)</i>	<i>Flutter Speed (KCAS)</i>	<i>Flutter Frequency (Hz)</i>
0.80	0.0	511	9.61
	1.0	549	9.60
0.90	0.0	501	9.58
	1.0	538	9.56
0.95	0.0	512	9.58
	1.0	555	9.58
0.98	0.0	522	9.59
	1.0	567	9.60
1.05	0.0	486	9.59
	1.0	510	9.59

SECTION 5

CORRELATION OF THE F-16 / STORE TYPICAL LCO PREDICTIONS WITH FLIGHT TEST DATA

5.1 Flight Test Result and Previous Numerical Prediction

Reference 1 reported that the so called typical limit cycle oscillation (LCO) occurred during the flight test of F-16A Block 15 with the store configuration described in Table 3.1. The instability response was characterized by a gradual onset of sustained limited amplitude wing oscillations where the oscillation amplitude progressively increases with increasing Mach number and dynamic pressure (Ref 1). The measured oscillatory wing tip response during level flight at five altitude is shown in Figure 3.2. Reference 1 described that the dynamic aeroelastic characteristic of the configuration were well behaved. The instability response was anti-symmetric at a frequency of 7.8 Hz for all altitudes.

An attempt to predict this typical LCO case has been conducted by Denegri in Refs 1 and 18. The calculation was performed at $M = 0.90$. The aerodynamic model used in Refs 1 and 18 is an isolated wing with tip launcher only, *i.e.* the same as the aerodynamic model # 1 of the present work as shown in Fig 5.1. No aerodynamic modeling of fuselage, empennage and underwing stores is included. The only influence of the fuselage, empennage and stores considered in the flutter analysis is their effect on structural modal characteristics. The flutter calculation was conducted using the non-matched method. The critical speed and its frequency are $V_f = 312$ KCAS and $f_f = 8.1$ Hz for $g = 0\%$, and $V_f = 312$ KCAS and $f_f = 8.1$ Hz for $g = 1\%$ (Ref 18). The result indicates that the flutter frequency was correlated well with the flight test data. However, the calculated flutter speed was lower than the flight test data.

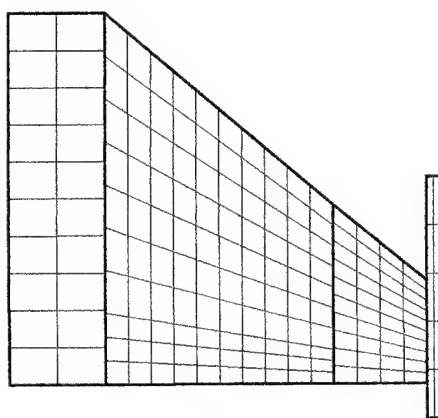


Figure 5.1 Aerodynamic Model # 1 for the typical LCO case

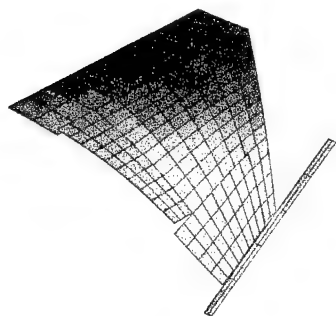
5.2. Linear Aerodynamic Approach

5.2.1 Aerodynamic Model # 1

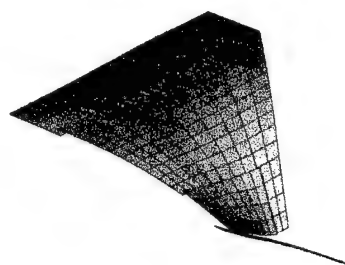
The first aerodynamic model of the present work is the isolated wing with tip launcher (Figure 5.1), *i.e* the same as the model used in Refs 1 and 18. Figure 5.2 shows the first four natural (undamped) mode shapes. Employing a non-matched point flutter analysis of ZAERO at $M=0.90$ and sea level density, the critical speed was found to be $V_f = 347$ KCAS and flutter frequency was $f_f = 8.08$ Hz for the structural damping $g = 0\%$. For the structural damping $g = 1\%$, the critical speed and frequency are $V_f = 531$ KCAS and $f_f = 8.09$ Hz, respectively. These results are very close to the analysis results in Refs 1 and 18 as shown in Table 5.1 and Fig 5.3. Figure 5.4 shows the flutter mode shape for $V_f = 531$ KCAS at several time steps. The V-g and V-f plots of the present flutter analysis given in Fig 5.4 show similar results to Fig 12 of Ref 17.

Table 5.1 Flutter Results Using Linear Aerodynamics at $M = 0.9$.

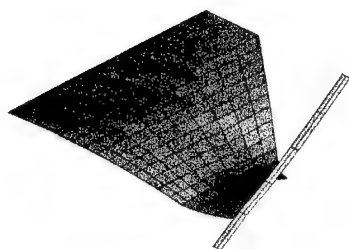
Aerodynamic Model or Methods		Flutter Speed (KCAS)	Flutter Frequency (Hz)
Flight test (on set of flutter speed)		530	7.8
Denegri's DLM results (Aerodynamic Model # 1: Wing + tip launcher only, non matched point)	$g = 0\%$	312	8.10
	$g = 1\%$	494	8.06
Aerodynamic Model # 1: Wing + tip launcher only, (non matched point)	$g = 0\%$	347	8.08
	$g = 1\%$	531	8.09
Aerodynamic Model # 2: Whole aircraft without underwing stores (matched point)	$g = 0\%$	413	8.01
	$g = 1\%$	492	8.00
Aerodynamic Model # 3: Whole aircraft with stores (matched point)	$g = 0\%$	482	7.96
	$g = 1\%$	593	7.91
Aerodynamic Model # 3: Whole aircraft with stores but without rigid body modes (matched point)	$g = 0\%$	483	7.96
	$g = 1\%$	601	7.91



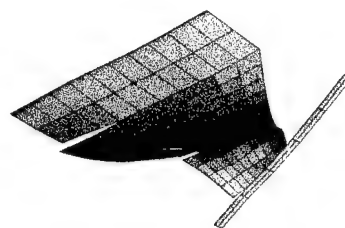
Mode 1 (7.89 Hz)



Mode 2 (8.15)



Mode 3 (10.06)



Mode 4 (10.31)

Figure 5.2 Vibration Modes of Aerodynamic Model # 2.

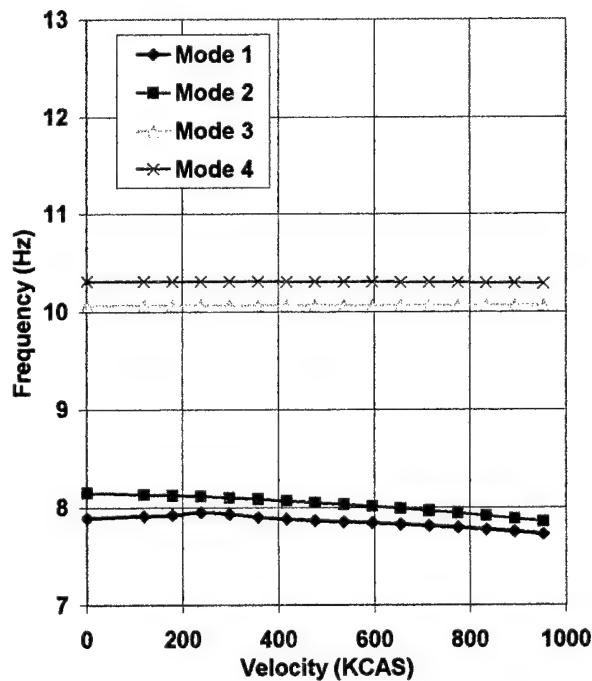
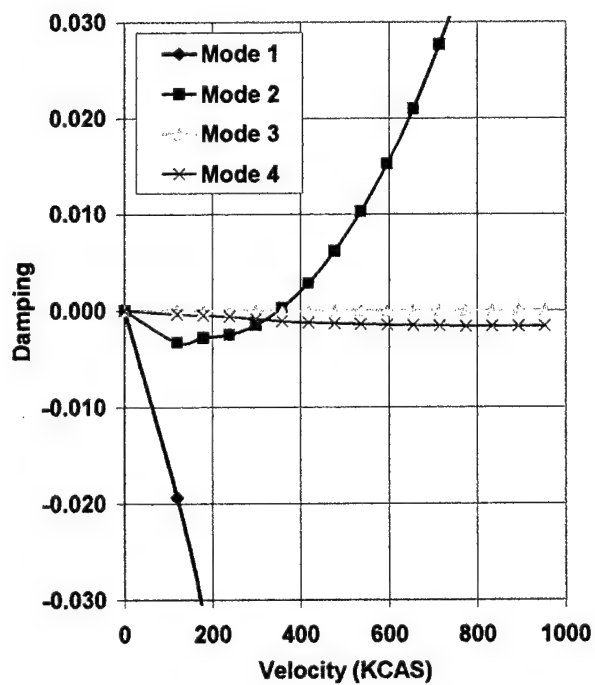


Figure 5.3 The Flutter V-G and V-F Plots for Wing-Tip Launcher Only Model at $M = 0.9$ Using The Linear Aerodynamic Approach.

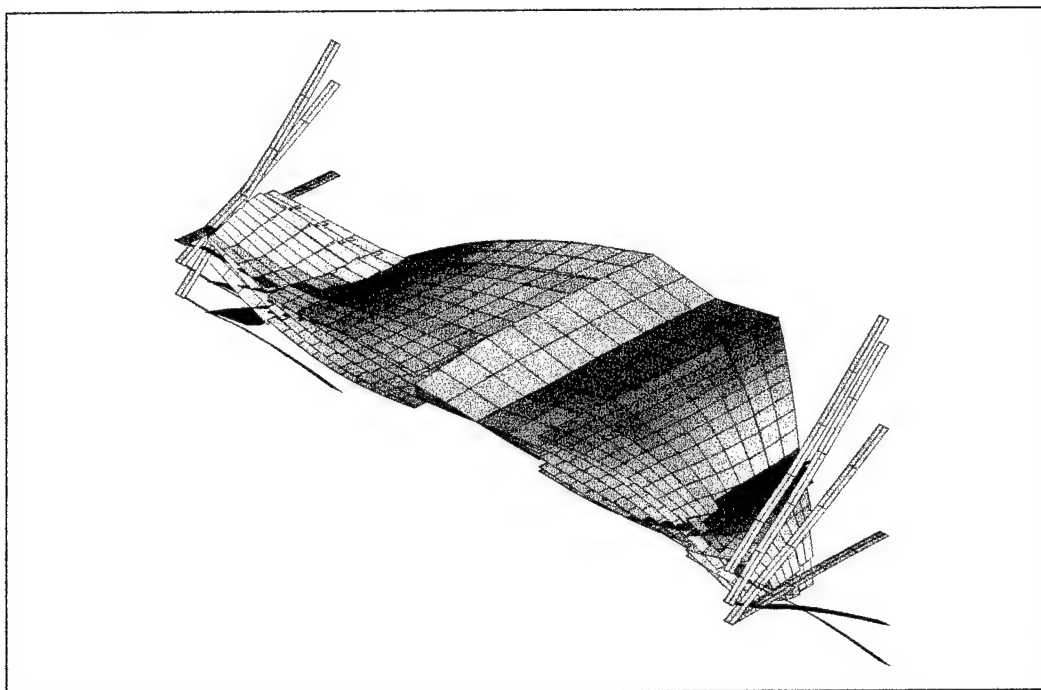


Figure 5.4 The Flutter Mode Shape of The Wingtip Launcher Only Model.

5.2.2. Aerodynamic Model # 2

The flutter calculation was repeated using the aerodynamic model # 2, i.e. the whole aircraft without underwing stores. The flutter calculation using the matched point method gave the flutter speed/frequency at $V_f = 413$ KCAS / $f_f = 8.09$ Hz for $g = 0\%$, and $V_f = 492$ KCAS / $f_f = 8.0$ Hz for $g = 1\%$. The result for this configuration shows that the inclusion of the fuselage and empennage aerodynamic model improves the result, i.e. closer to the flight test data.

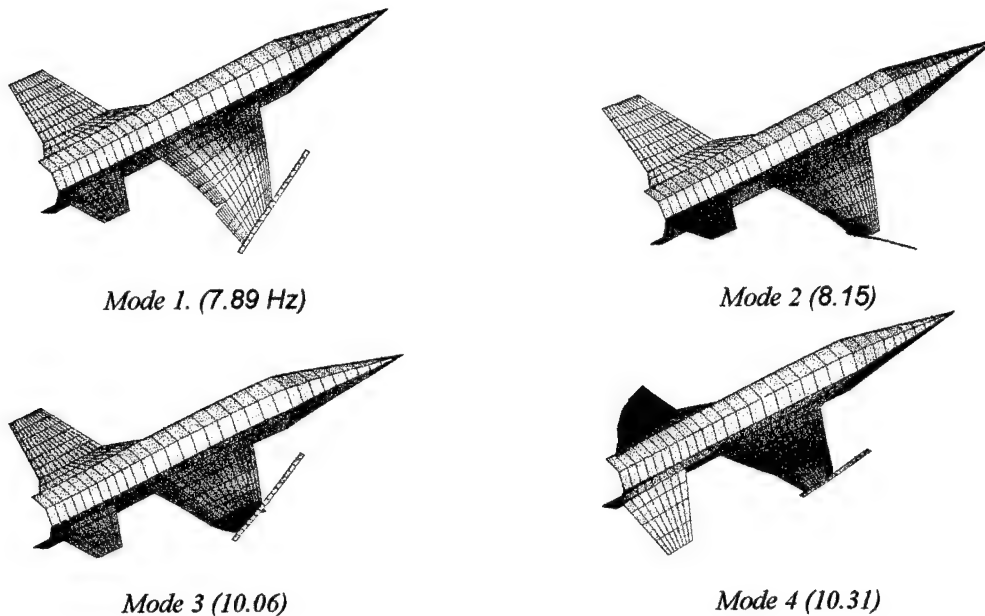


Figure 5.5 Vibration Modes of the Aircraft Model without Underwing Stores.

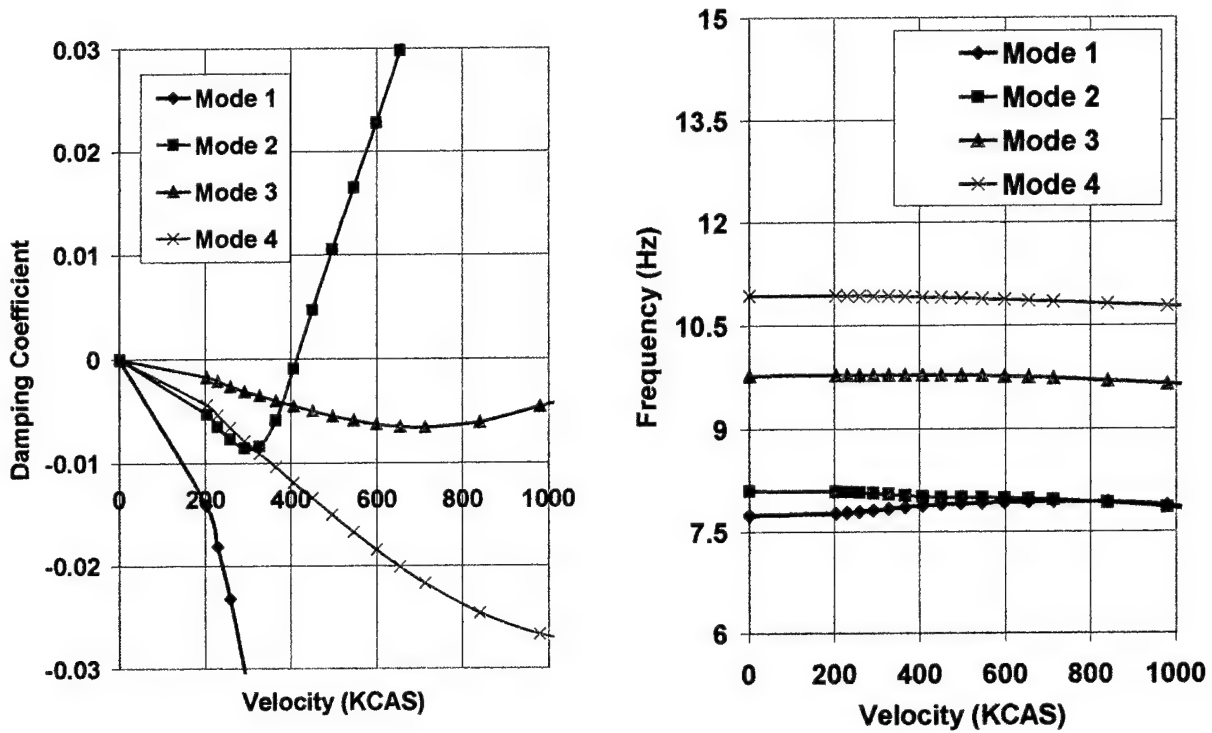


Figure 5.6 The Flutter V-G and V-F Plots for the Whole Aircraft Model without Underwing Stores at $M = 0.9$ Using the Linear Aerodynamic Approach.

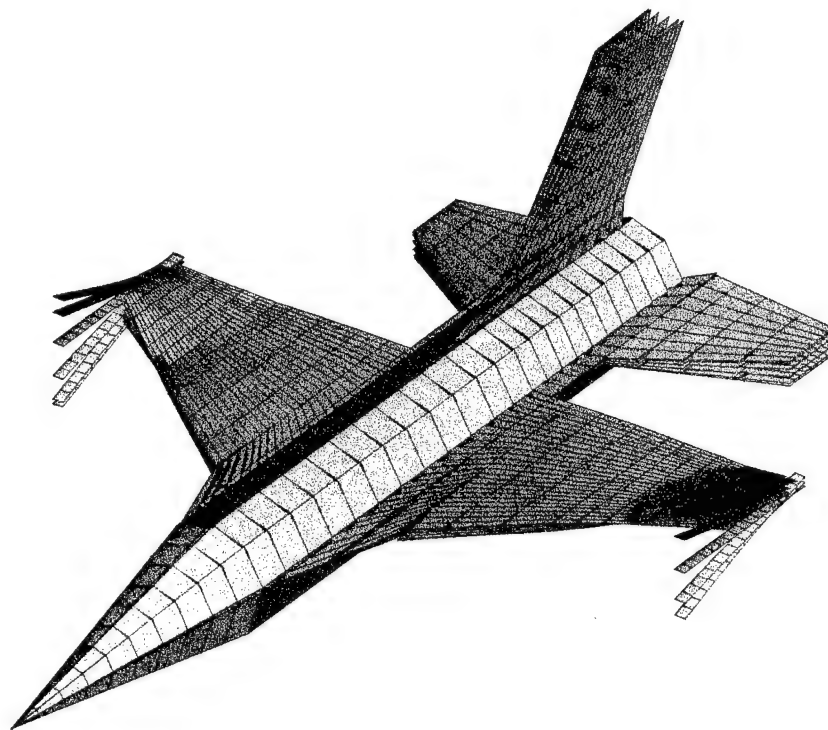


Figure 5.7 The Flutter Mode Shape of the Aircraft Model without Underwing Stores.

5.2.3. Aerodynamic Model # 3 at $M = 0.90$

The flutter calculation was repeated using the aerodynamic model # 3, i.e. the whole aircraft with underwing stores. The natural mode shapes are shown in Figure 5.8. The flutter calculation using the matched point method gave the flutter speed/frequency at $V_f = 483$ KCAS / $ff = 7.96$ Hz. If the structural damping is assumed to be $g = 1.0\%$ than the flutter speed and frequency becomes $V_f = 601$ KCAS and $ff = 7.91$ Hz.

All of the previous calculations on the typical LCO case did not include the structural rigid body modes. If the anti-symmetric rigid body modes are included to the whole aircraft with store model, the similar procedures gave the flutter speed / frequency at $V_f = 482$ KCAS / $ff = 7.96$ Hz for $g=0\%$, and $V_f = 593$ KCAS / $ff = 7.91$ Hz for $g = 1.0\%$. These results are very close to the results of the model without rigid body modes. Therefore, for the typical LCO of the present case, the influence of the rigid body modes is not significant. Figure 5.9 shows the flutter v-g and V-f diagram for the aerodynamic model # 3. The flutter modes for several time steps is presented in Fig 5.10.

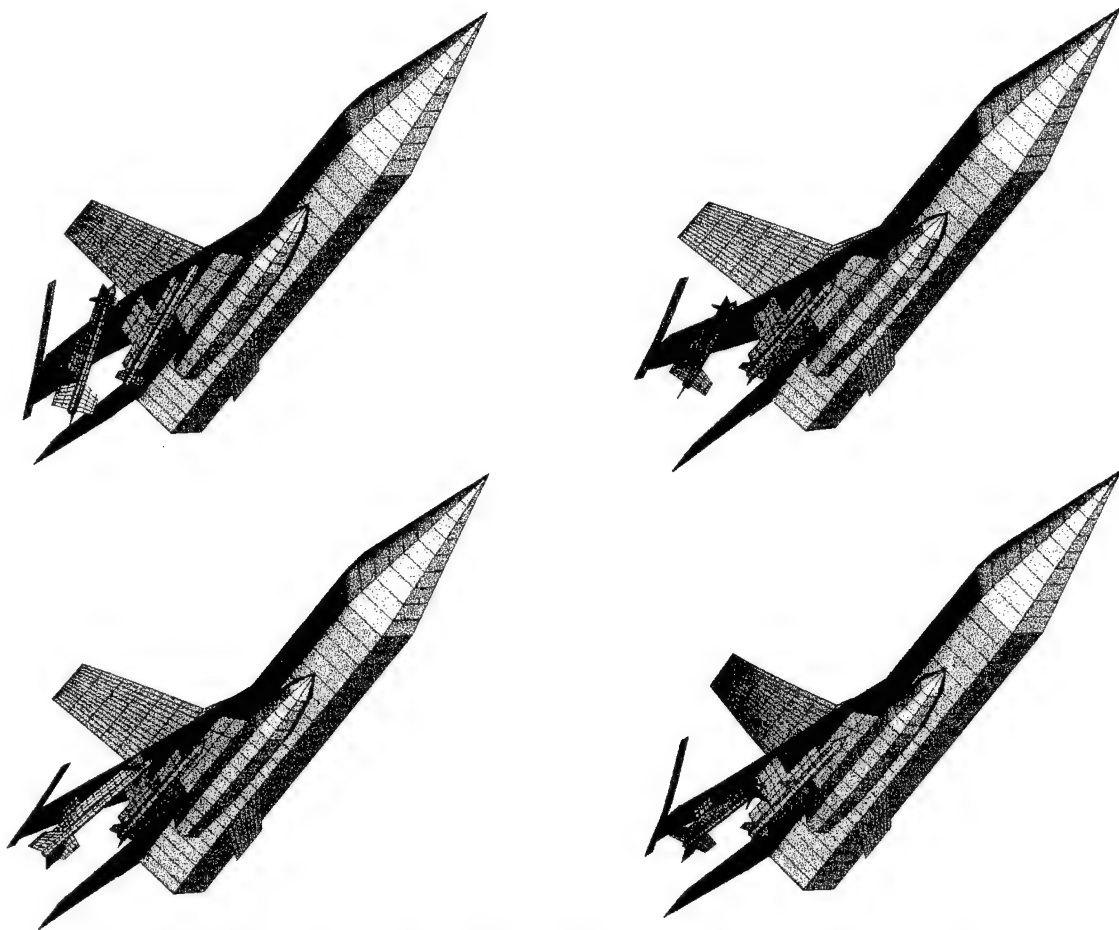


Figure 5.8 Vibration Modes of the Aircraft Model with Underwing Stores

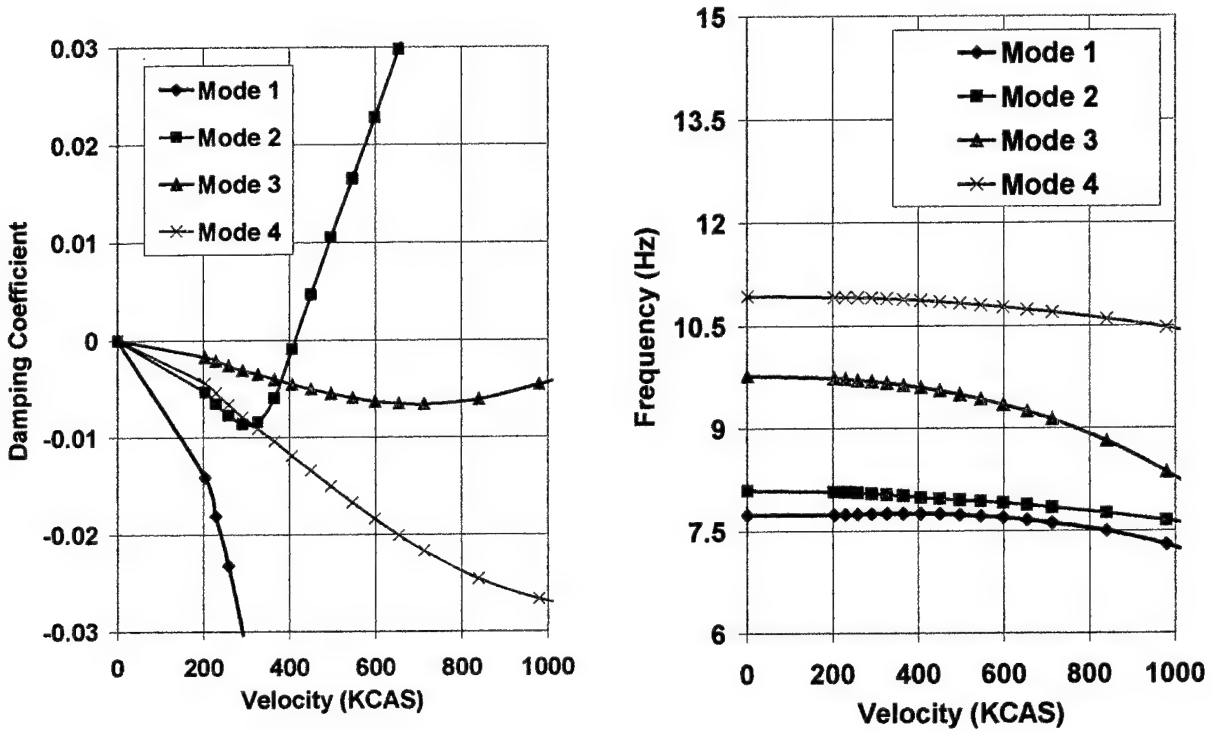


Figure 5.9 The Flutter V-g and V-f plots of the Whole Aircraft Model with Underwing Stores at $M = 0.9$ Using the Linear Aerodynamic Approach.

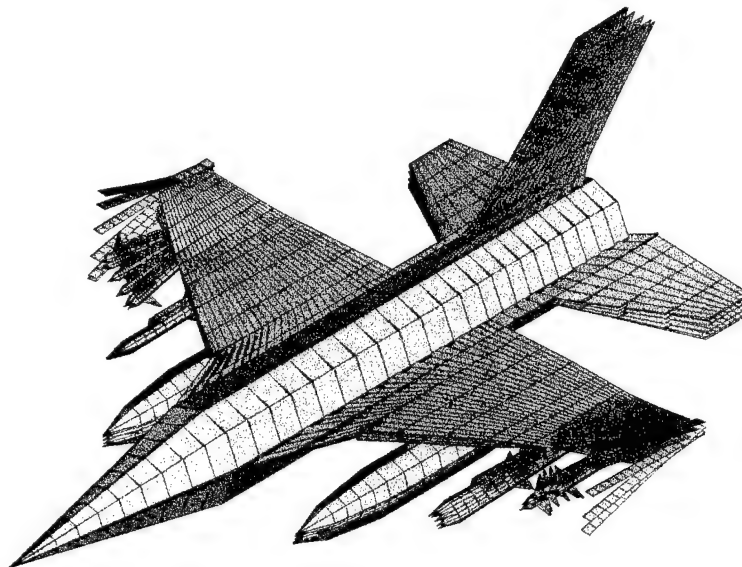


Figure 5.10 The Flutter Mode Shape of the Whole Aircraft Model with Underwing Stores At $M = 0.9$.

5.2.5. Aerodynamic Model # 3 at Mach 0.8 – 1.05

The flutter calculations for $M = 0.90$ showed improvement on the solution results if a more refined aerodynamic model is used. However, previous results does not give a direct correlation between the flutter prediction and the flight test data. Note that, to indicate the flutter onset, the flight test data presents the measure acceleration response level in terms of Mach numbers and altitudes. Therefore, in order to correlate the numerical predictions with the flight test data, the calculation was repeated for several Mach numbers, including $M = 0.80, 0.90, 0.95, 0.98$, and 1.05 . The flutter solution is represented by the damping coefficient as a function of Mach number for each altitude. The critical speed and frequency for each Mach number are given in Table 5.2. Note that the correlation of the flutter prediction with the altitude is automatically generated by using the matched point option of the g-method.

The results presented in Fig 5.11. indicates that :

- at sea level, the linear aerodynamic approach gives a lower mach number than onset mach number of the flight test LCO data.
- at higher altitudes, the linear aerodynamic approach gives a higher mach number than the flight test data.

Table 5.2 Critical Speed and Frequency Using the Linear Aerodynamic Approach (ZONA6/ZONA7)

<i>Mach Number</i>	<i>Damping Coeff. g (%)</i>	<i>Flutter Speed (KCAS)</i>	<i>Flutter Frequency (Hz)</i>
0.80	0.0	534	7.95
	1.0	654	7.90
0.90	0.0	482	7.96
	1.0	593	7.91
0.95	0.0	431	7.97
	1.0	541	7.92
0.98	0.0	429	7.96
	1.0	526	7.92
1.05	0.0	450	7.93
	1.0	522	7.89

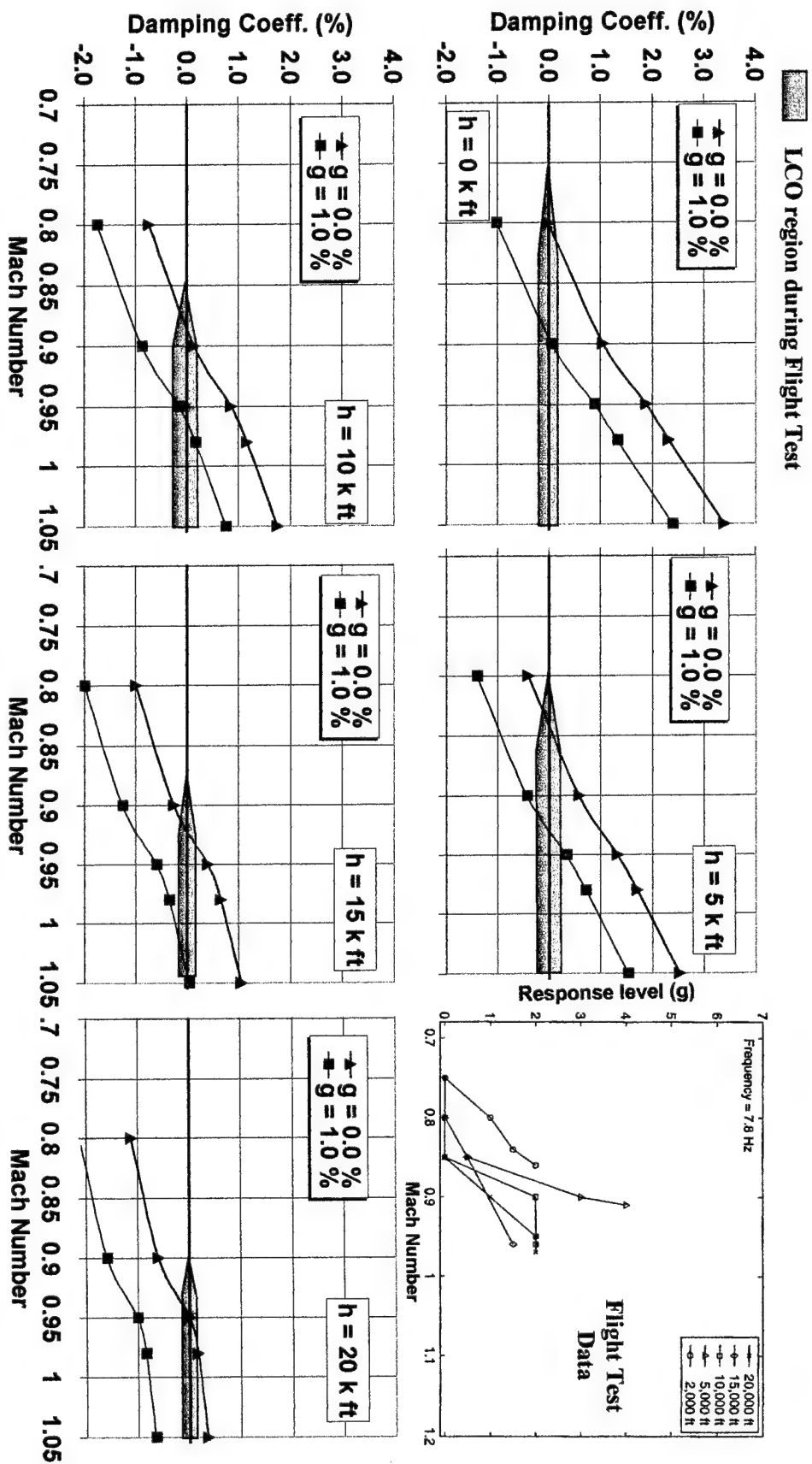


Fig 5.11 Correlation between the Flutter Prediction Using the Linear Aerodynamic Approach (ZONA6/ZONA7) with Flight Test Data.

5.3. Nonlinear Aerodynamic Approach

The flight test for the typical LCO configuration indicated that the aeroelastic instability for this case occurred between 0.75 and 1.1, *i.e.* in transonic regime where the nonlinear behavior of the aerodynamic flow may significantly influence the critical speed. To investigate the flutter calculation in this transonic regime, a nonlinear aerodynamic approach based on the ZTAIC method was used for the prediction of the unsteady aerodynamic data. The steady aerodynamic data was provided by Denegri of Eglin Airforce Base as shown in Section 3. Flutter calculation was conducted to the whole aircraft with stores for Mach numbers ranging between 0.80 and 1.05. The rigid body modes were included in the structural dynamic calculations.

5.3.1 Aerodynamic Model # 3 at $M = 0.90$

The flutter calculation for $M = 0.90$ using the matched point method gave the flutter speed/frequency at $V_f = 468$ KCAS / $f_f = 7.97$ Hz. Note that there is no second critical speed in this third model. If the structural damping is assumed to be $g = 1.0\%$, the flutter speed and frequency becomes $V_f = 588$ KCAS and $f_f = 7.93$ Hz. Compare to the results based on the linear aerodynamic approach given in Table 5.1, the present result using the nonlinear aerodynamic approach is closer to the flight test data. Figure 5.12 shows the V-g and V-f plot for Mach 0.90. The associated flutter mode is presented in Fig 5.13.

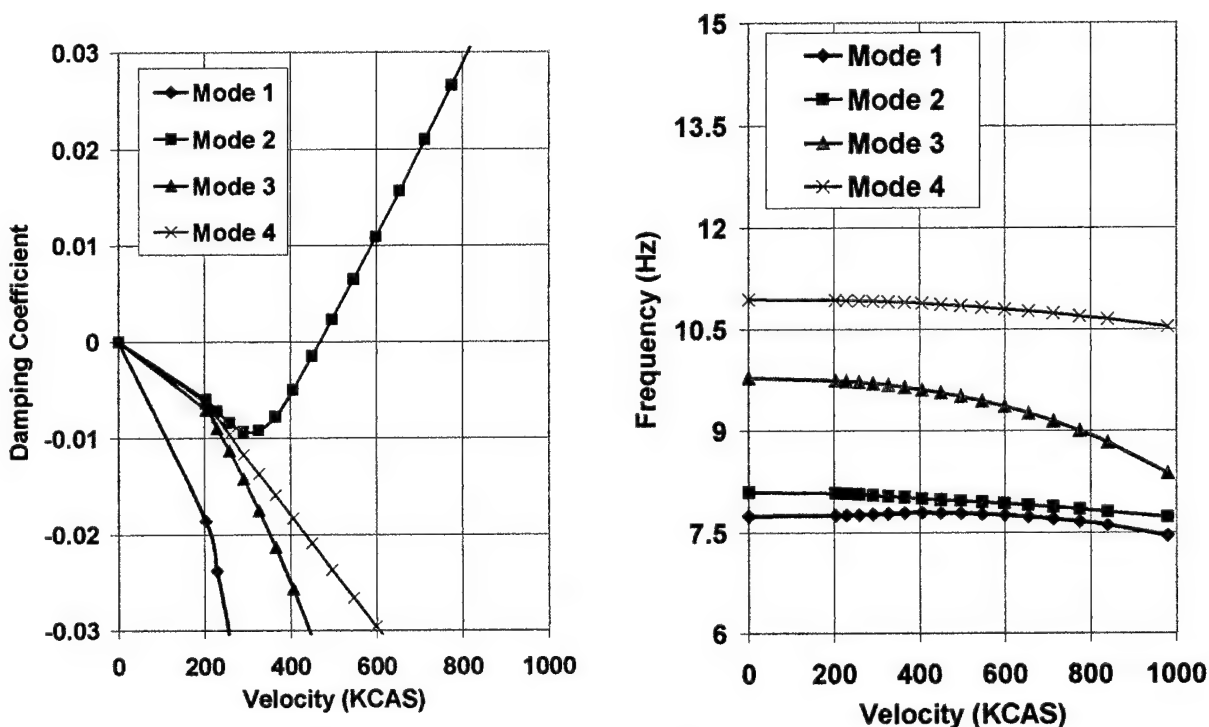


Figure 5.12 The Flutter V-G and V-F Plots of the Whole Aircraft Model with Underwing Stores at $M = 0.9$ Using the Nonlinear Aerodynamic Approach.

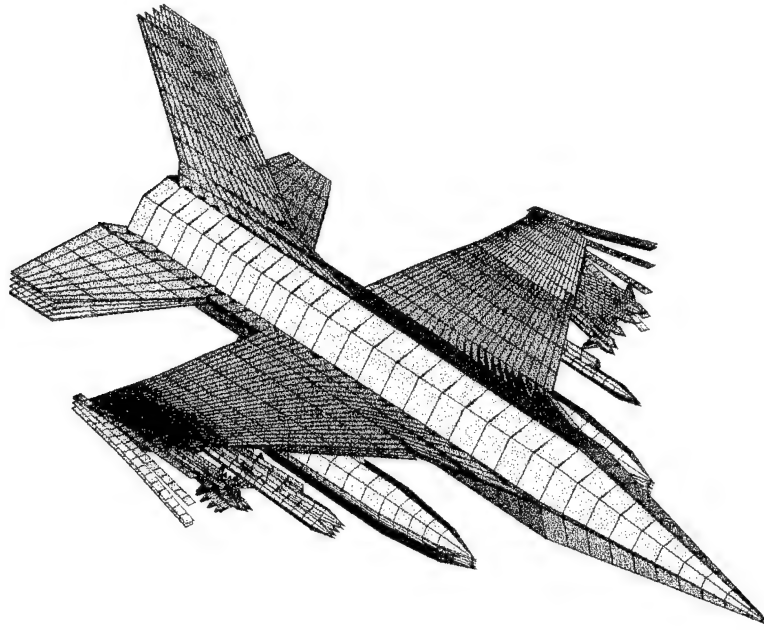


Figure 5.13 The Flutter Mode Shape of the Whole Aircraft Model with Underwing Stores at $M = 0.9$ Calculated Using the Non Linear Aerodynamic Method

5.3.2. Aerodynamic Model # 3 at $M = 0.80 - 1.05$

In order to correlate the numerical predictions with the flight test data, the calculation for the nonlinear aerodynamic approach was repeated for several Mach numbers, namely $M = 0.80$, 0.90 , 0.95 , 0.98 , and 1.05 . The flutter solution is represented by the damping coefficient and Mach number as well as the altitudes. The critical speed and frequency for each Mach number are given in Table 5.3. The results presented in Fig 5.15 shows that:

- ZTAIC predicts non-explosive damping of the unstable modes for all altitudes.
- In the post-flutter region, it is very likely that the nonlinearity-induced stable damping (from either the structures or aerodynamics, if any) can nullify the unstable damping and stop the growth of the amplitude, leading to LCO.
- Similar to the classical flutter case, the on-set of LCO is very sensitive to the linear structural damping level.

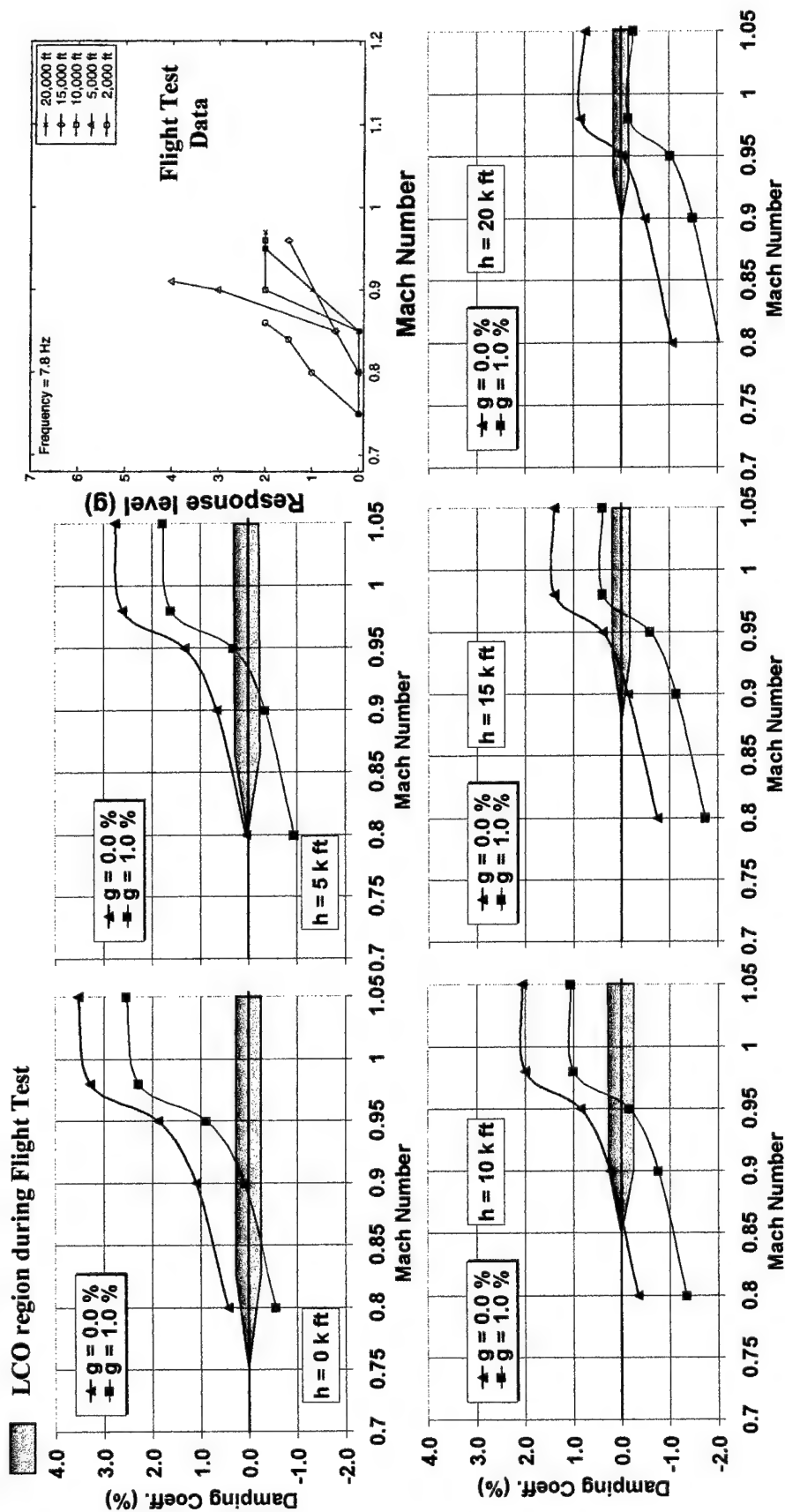


Figure 5.14 The Correlation between the Flutter Prediction using the Nonlinear Aerodynamic Approach (ZTAIC) and the Flight Test Data.

Table 5.3 Critical speed and Frequency Using the Nonlinear Aerodynamic Approach (ZTAIC).

<i>Mach Number</i>	<i>Damping Coeff. g (%)</i>	<i>Flutter Speed (KCAS)</i>	<i>Flutter Frequency (Hz)</i>
0.80	0.0	480	7.97
	1.0	606	7.95
0.90	0.0	468	7.97
	1.0	588	7.93
0.95	0.0	409	7.99
	1.0	525	7.95
0.98	0.0	372	8.00
	1.0	455	7.98
1.05	0.0	422	7.94
	1.0	494	7.92

SECTION 6

CORRELATION OF THE F-16 / STORE NON-TYPICAL LCO PREDICTIONS WITH FLIGHT TEST DATA

6.1 Flight Test Result and Previous Numerical Prediction

Reference 1 described that a non-typical LCO response occurred during the flight test of F-16 with the store configurations shown in Table 3.1. The instability response was characterized by a gradual onset of sustained limited amplitude wing oscillations where the oscillation amplitude does not progressively increase with increasing Mach number (Ref 1). The oscillation may be present only in a limited portion of the flight envelope. The measured oscillatory wing tip response during level flight at five altitude is shown in Figure 3.3. The response behavior of this configuration was only sensitive in 0.88 – 0.94 Mach range. The instability response was antisymmetric at a frequency of 8.2 Hz for all altitudes.

An attempt to predict this non-typical LCO case has been conducted by Denegri in Refs 1 and 18. The calculation was performed at $M = 0.90$. The aerodynamic model used in Refs 1 and 18 is an isolated wing with tip launcher only, *i.e.* the same as the aerodynamic model # 1 of the present work as shown in Fig 6.1. No aerodynamic modeling of fuselage, empenage and underwing stores is included. The only influence of the fuselage, empenage and stores considered in the flutter analysis is their effect on structural modal characteristics. The flutter calculation was conducted using the non-matched point method. The critical speed and frequency are $V_f = 393$ KCAS and $f_f = 8.26$ Hz for the structural damping $g = 0\%$. The result indicates that the flight test frequency is well correlated with the critical mode frequency. However, the calculated critical speed was higher than the flight test data as shown in Table 4.1

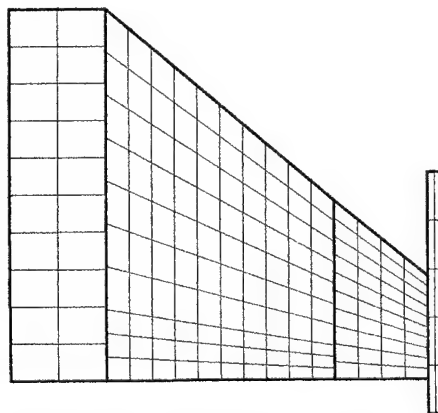


Figure 6.1 Aerodynamic Model # 1 for the Nontypical LCO case

6.2 Linear Aerodynamic Approach

6.2.1 Aerodynamic Model # 1

The first aerodynamic model of the present work is the isolated wing with tip launcher (Figure 6.1), *i.e* the same as the model used in Ref 17. Figures 6.2 show the first four natural (undamped) mode shapes. Employing a non-matched point flutter analysis of ZAERO at $M=0.90$ and sea level density, the critical speed was found to be $V_f = 403$ KCAS and flutter frequency was $f_f = 8.24$ Hz for the structural damping $g = 0\%$. For the structural damping $g = 1\%$, the critical speed and frequency are $V_f = 602$ KCAS and $f_f = 8.21$ respectively. These results are very close to the analysis results in Refs 1 and 18 as shown in Table 6.1 and Fig 6.3. Figure 6.4 shows the flutter mode shape at several time steps. The V-g and V-f plots of the present flutter analysis given in Fig 6.4 show similar results to Fig 12 of Ref 17.

Table 6.1 Flutter Results Using Linear Aerodynamics at $M = 0.9$.

Aerodynamic Model or Methods		Flutter Speed (KCAS)	Flutter Frequency (Hz)
Flight test (on set of flutter speed)		560	8.2
Denegri's DLM results (Aerodynamic Model # 1: Wing + tip launcher only, non matched point, $g = 0\%$)		393	8.26
Aerodynamic Model # 1: Wing + tip launcher only, (non matched point)	$g = 0\%$	403	8.24
	$g = 1\%$	602	8.21
Aerodynamic Model # 2: Whole aircraft without underwing stores (matched point)	$g = 0\%$	508	8.22
	$g = 1\%$	678	8.18
Aerodynamic Model # 3: Whole aircraft with stores (matched point)	$g = 0\%$	471	8.18
	$g = 1\%$	690	8.08
Aerodynamic Model # 3: Whole aircraft with stores but without rigid body modes (matched point)	$g = 0\%$	642	8.13
	$g = 1\%$	796	8.03

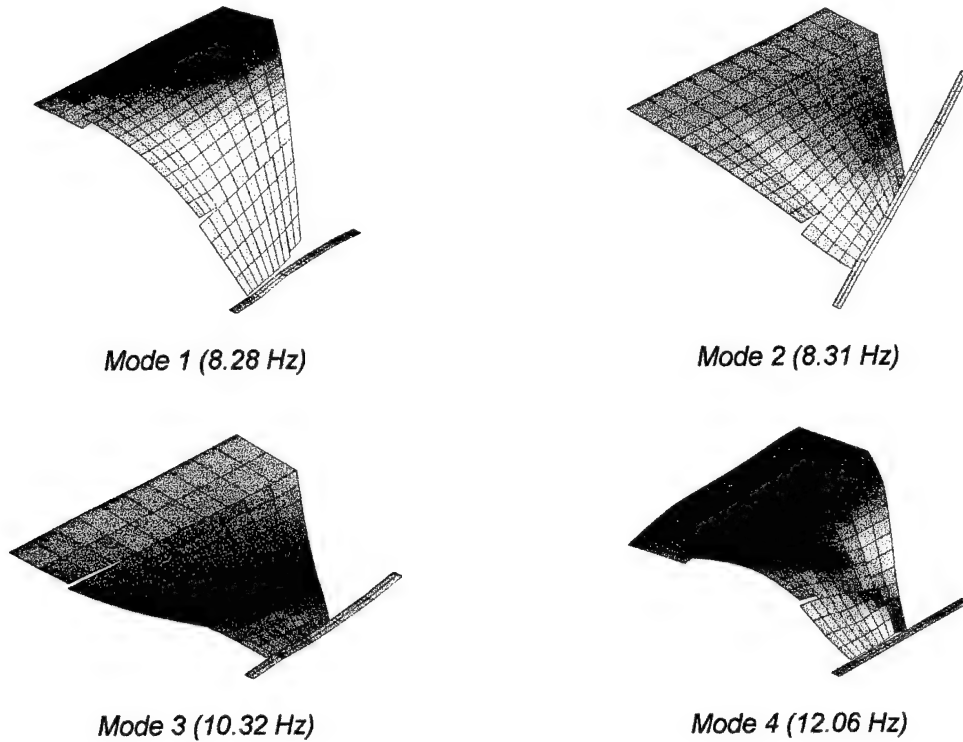


Figure 6.2 Vibration Modes of Aerodynamic Model # 1.

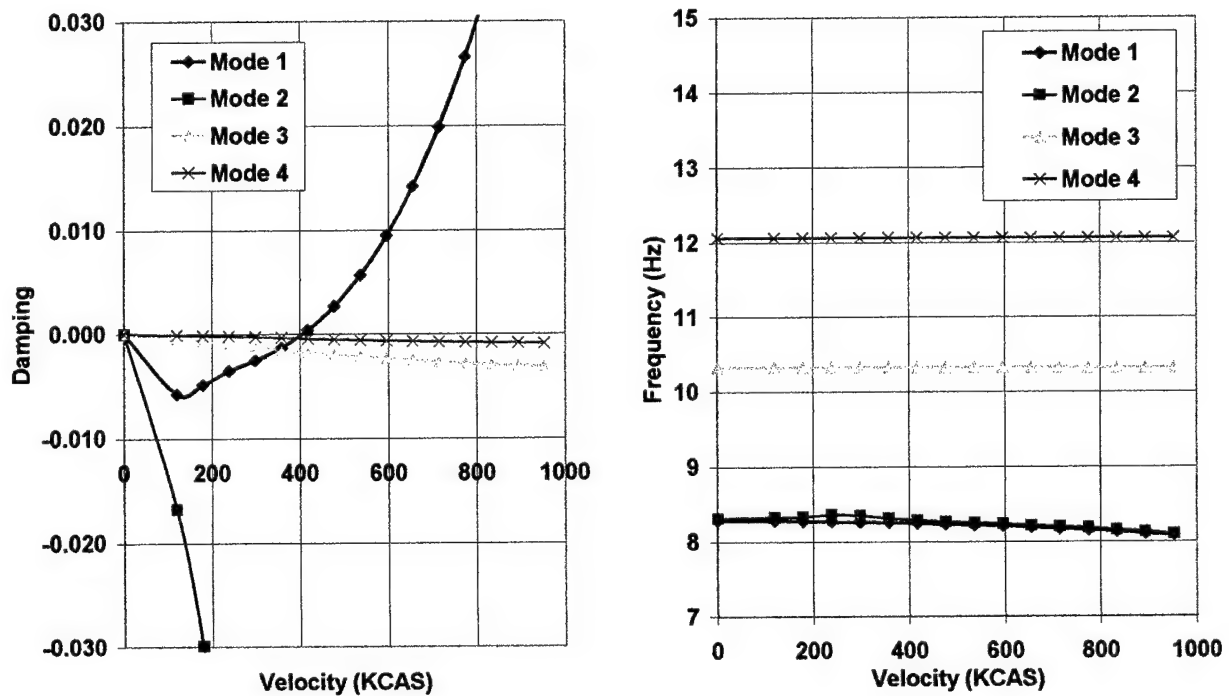


Figure 6.3 The Flutter V-g and V-f plots for Wing-tip Launcher Only Model at $M = 0.9$ Using the Linear Aerodynamic Approach.

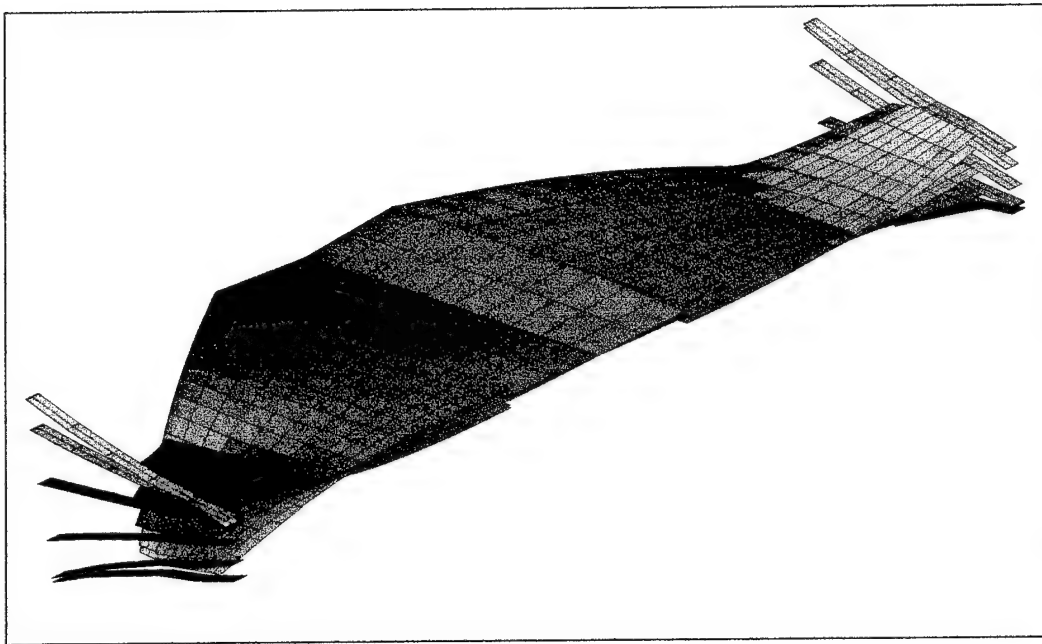


Figure 6.4 The Flutter Mode Shape of the Wing-Tip Launcher Only Model.

6.2.2 Aerodynamic Model # 2

The flutter calculation was repeated using the aerodynamic model # 2, i.e. the whole aircraft without underwing stores. The flutter calculation using the matched point method gave the flutter speed/frequency at $V_f = 508$ KCAS / $f_f = 8.22$ Hz. If the structural damping is assumed to be $g = 1.0\%$, then the flutter speed and frequency becomes $V_f = 678$ KCAS and $f_f = 8.18$ Hz. The result for this configuration shows that the inclusion of the fuselage and empennage aerodynamic model improves the result, i.e. closer to the flight test data.

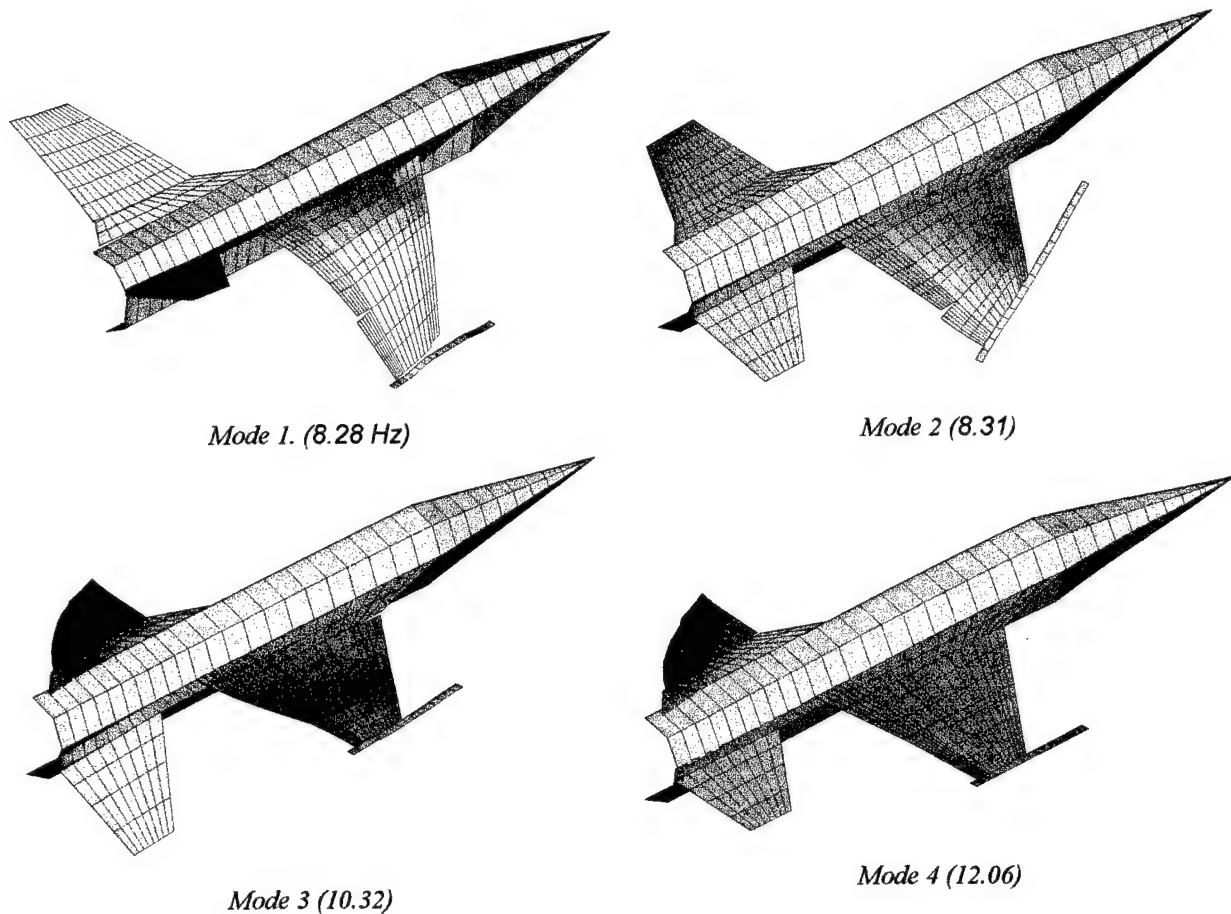


Figure 6.5 Vibration Modes of the Aircraft Model without Underwing Stores.

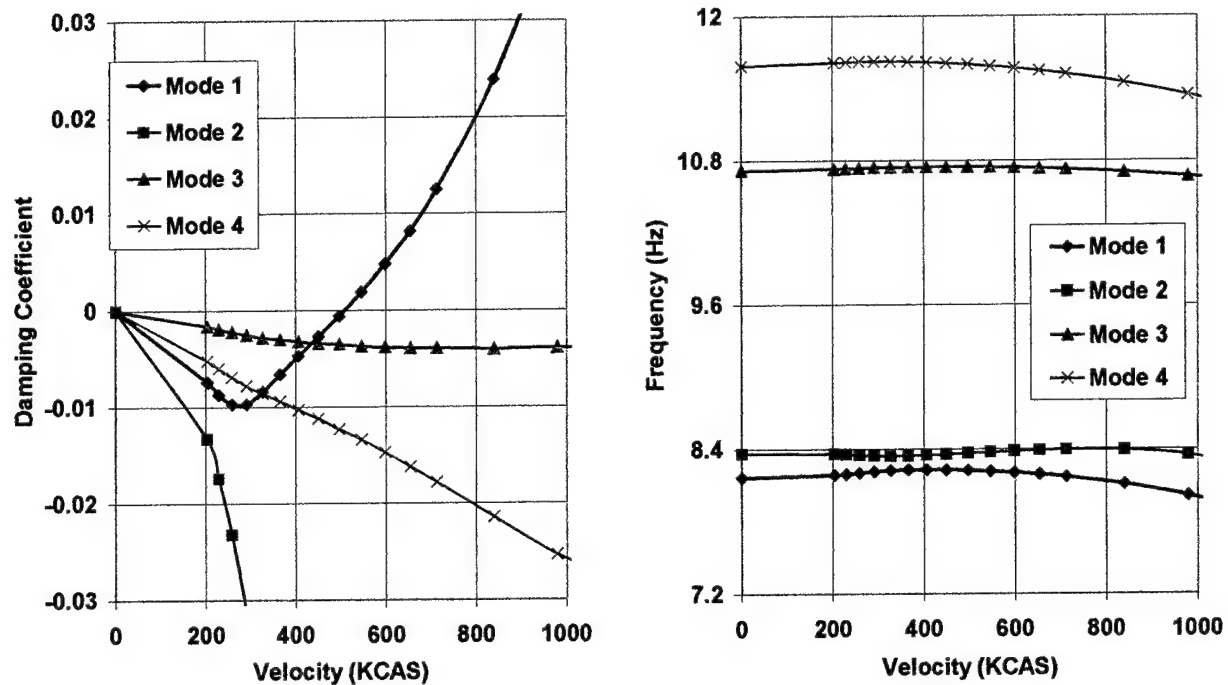


Figure 6.6 The Flutter V-g and V-f Plots for the Whole Aircraft Model without Underwing Stores at M = 0.9 Using The Linear Aerodynamic Approach.

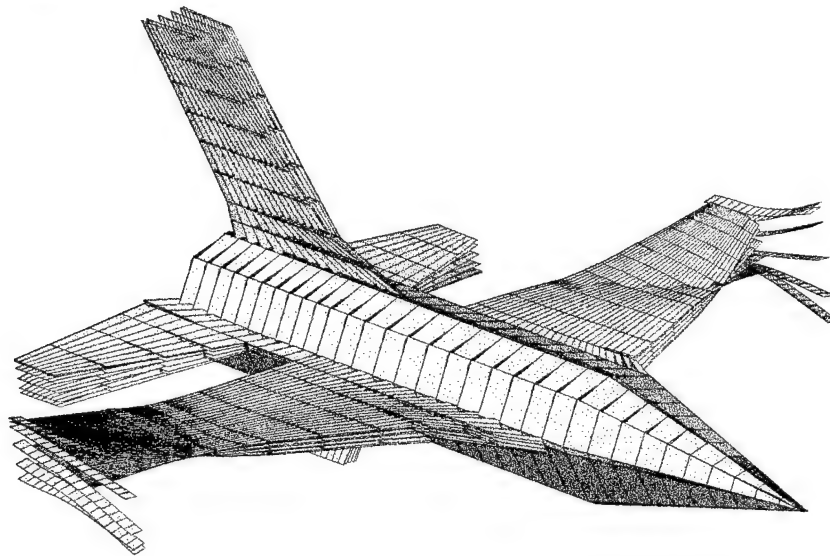


Figure 6.7 The Flutter Mode Shape of the Aircraft Model without Underwing Stores

6.2.3 Aerodynamic Model # 3 at M = 0.90

The flutter calculation was repeated using the aerodynamic model # 3, i.e. the whole aircraft with underwing stores. The natural mode shapes are shown in Figure 6.8. The flutter calculation

using the matched point method gave the flutter speed/frequency at $V_f = 642$ KCAS / $f_f = 8.13$ Hz. Note that there is no second critical speed in this third model. If the structural damping is assumed to be $g = 1.0\%$ than the flutter speed and frequency becomes $V_f = 796$ KCAS and $f_f = 8.03$ Hz. Clearly, the result for this configuration is closer to the flight test data as shown in Table 6.1.

All of the previous calculations on the non-typical LCO did not include the structural rigid body modes. If the anti-symmetric rigid body modes are included to the whole aircraft with store model, the similar procedures gave the flutter speed / frequency at $V_f = 471$ KCAS / $f_f = 8.18$ Hz for $g=0\%$, and $V_f = 690$ KCAS / $f_f = 8.08$ Hz for $g = 1.0\%$. These results are very close to the results of the model without rigid body modes. Therefore, for the classical flutter of the present case, the influence of the rigid body modes is not significant. Figure 6.9 shows the flutter V-g and V-f diagram for the aerodynamic model # 3. The flutter modes for several time steps is presented in Fig 6.10.

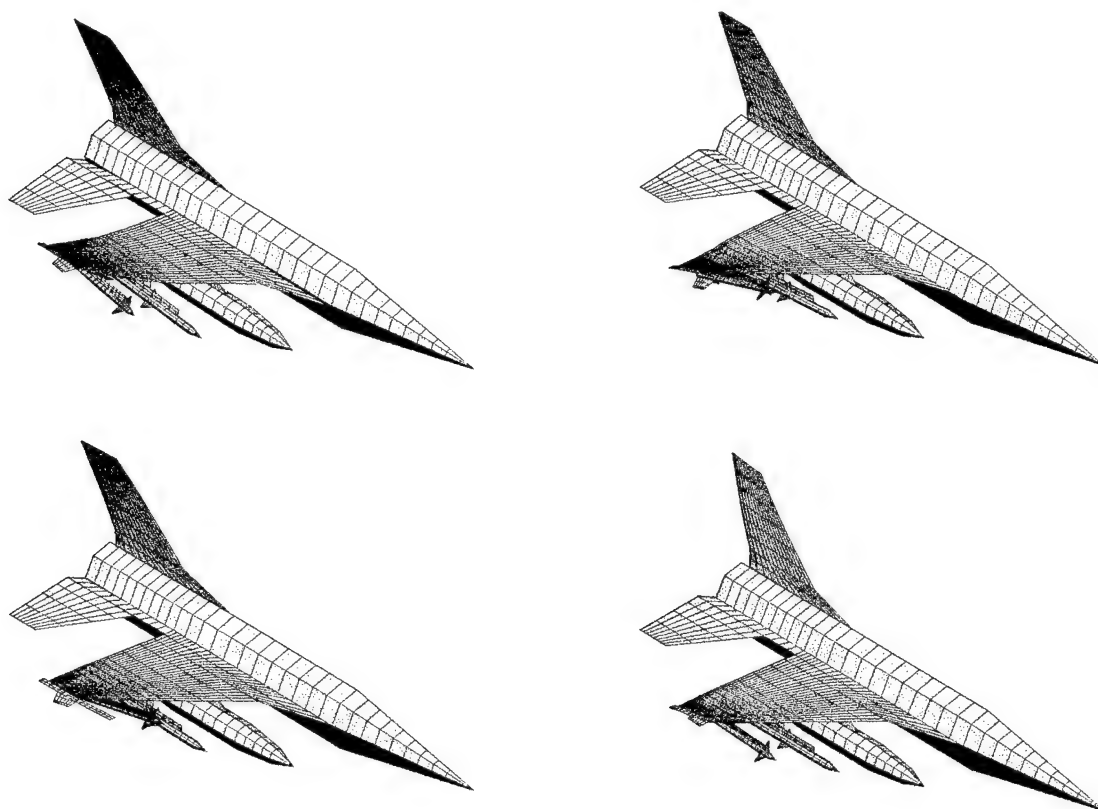


Figure 6.8 Vibration Modes of the Aircraft Model with Underwing Stores.

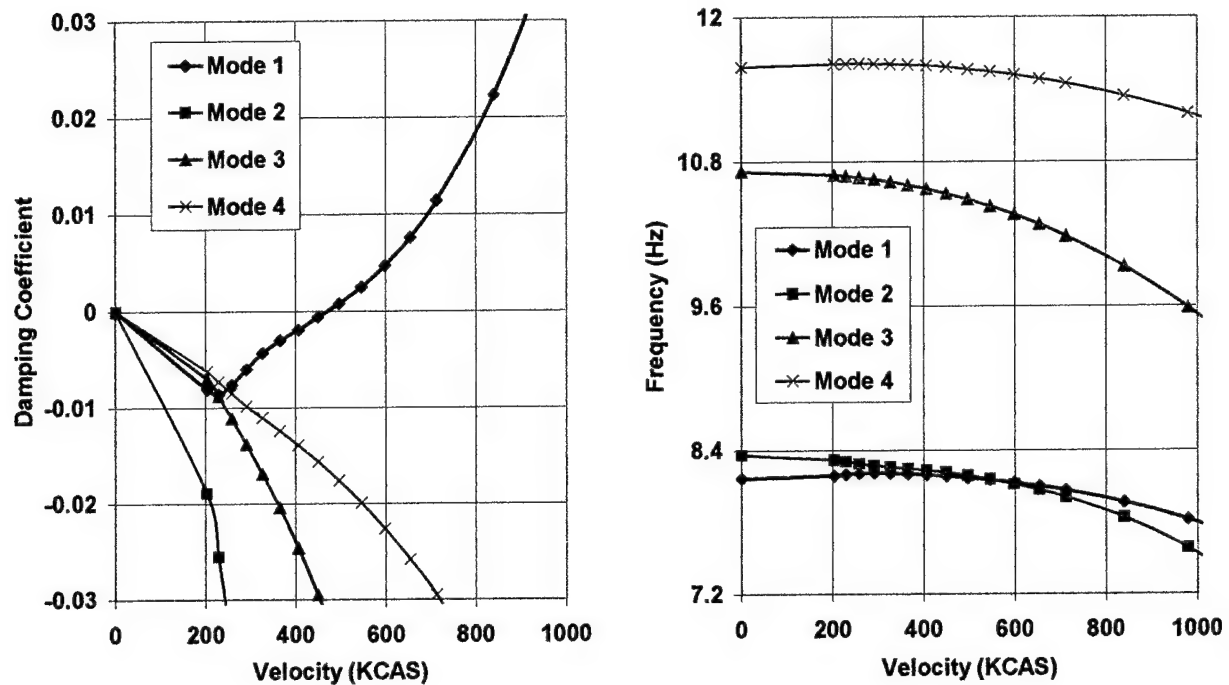


Figure 6.9 The Flutter V-g and V-f plots of the Whole Aircraft Model with Underwing Stores at $M = 0.9$ Using the Linear Aerodynamic Approach.

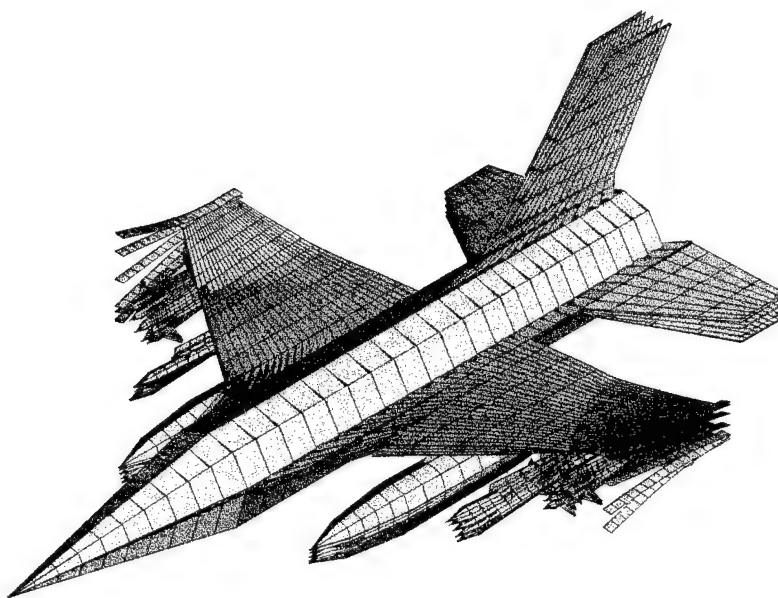


Figure 6.10 The Flutter Mode Shape of the Whole Aircraft Model with Underwing Stores at $M = 0.9$.

6.2.4 Aerodynamic Model # 3 at Mach 0.8 – 1.05

The flutter calculations for $M = 0.90$ showed improvement on the solution results if a more refined aerodynamic model is used. However, previous results does not give a direct correlation between the flutter prediction and the flight test data. Note that, to indicate the flutter onset, the flight test data presents the measure acceleration response level in terms of Mach numbers and altitudes. Therefore, in order to correlate the numerical predictions with the flight test data, the calculation was repeated for several Mach numbers, namely $M = 0.80, 0.90, 0.95, 0.98$, and 1.05 . The flutter solution is represented by the damping coefficient as a function of Mach number for each altitude. The critical speed and frequency for each Mach number are given in Table 6.2. The results presented in Fig 6.11. shows that

- Linear aerodynamic approach (ZONA6/ZONA7) predicts non-explosive damping of the unstable mode in all altitudes.
- For the altitude lower than 15,000 ft, the flutter onset Mach number of the flight test data was correlated very well with the linear aerodynamic approach if the structural damping is assumed to be 1%.
- For the altitude of 15,000 ft and higher, the onset Mach number of the flight test data was occurred near $M = 0.98$ and 1.02 where the nonlinearity effect of the transonic aerodynamic is significant. Therefore, the linear aerodynamic approach gives a higher prediction of the onset Mach number for these altitudes.

**Table 6.2 Critical Speed and Frequency Using ZONA6/ZONA7
(Linear Aerodynamic Approach).**

<i>Mach Number</i>	<i>Damping Coeff. g (%)</i>	<i>Flutter Speed (KCAS)</i>	<i>Flutter Frequency (Hz)</i>
0.80	0.0	576	8.15
	1.0	778	8.03
0.90	0.0	571	8.17
	1.0	615	8.08
0.95	0.0	451	8.17
	1.0	656	8.08
0.98	0.0	474	8.17
	1.0	660	8.08
1.05	0.0	376	8.20
	1.0	573	8.11

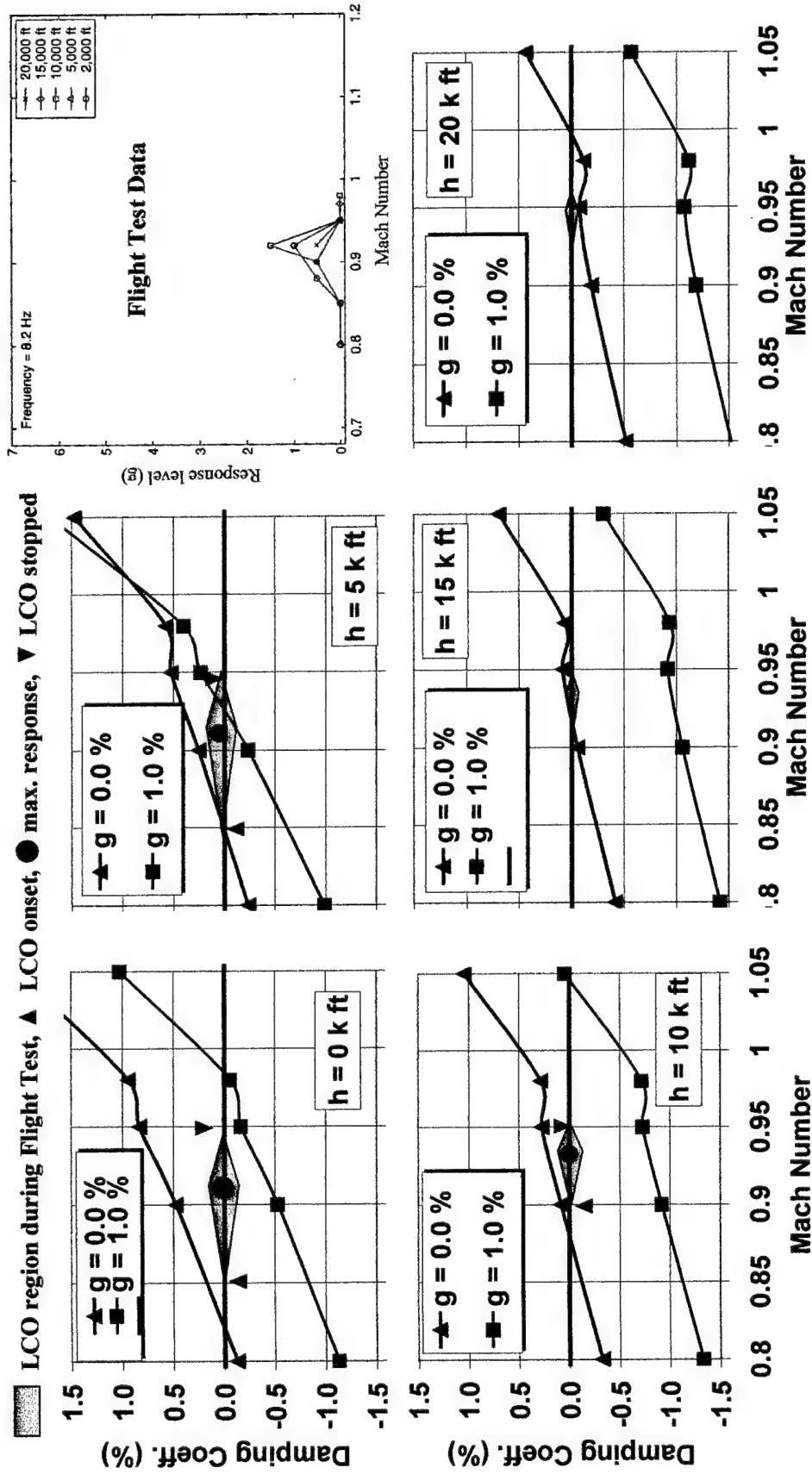


Figure 6.11 Correlation between the Flutter Prediction using the Linear Aerodynamic Approach (ZONA6/ZONA7) with Flight Test Data of the Classical Flutter Case.

6.3 Nonlinear Aerodynamic Approach

The flight test for the non-typical LCO configuration indicated that the aeroelastic instability for this case occurred between 0.85 and 1.1, *i.e.* in transonic regime where the nonlinear behavior of the aerodynamic flow may significantly influence the critical speed. To investigate the flutter calculation in this transonic regime, a nonlinear aerodynamic approach based on the ZTAIC method was used for the prediction of the unsteady aerodynamic data. The steady aerodynamic data was provided by Ref 20 as shown in section 3. Flutter calculation was conducted to the whole aircraft with stores for Mach numbers ranging between 0.80 and 1.05. The rigid body modes were included in the structural dynamic calculations.

6.3.1 Aerodynamic Model # 3 at $M = 0.90$

The flutter calculation for $M = 0.90$ using the matched point method gave the flutter speed/frequency at $V_f = 630$ KCAS / $f_f = 8.16$ Hz. If the structural damping is assumed to be $g = 1.0\%$, the flutter speed and frequency becomes $V_f = 595$ KCAS and $f_f = 8.18$ Hz. Compared to the results based on the linear aerodynamic approach given in Table 6.1, the present result using the nonlinear aerodynamic approach is closer to the flight test data. Figure 6.12 shows the V-g and V-f plot for Mach 0.90. The associated flutter mode is presented in Fig 6.13.

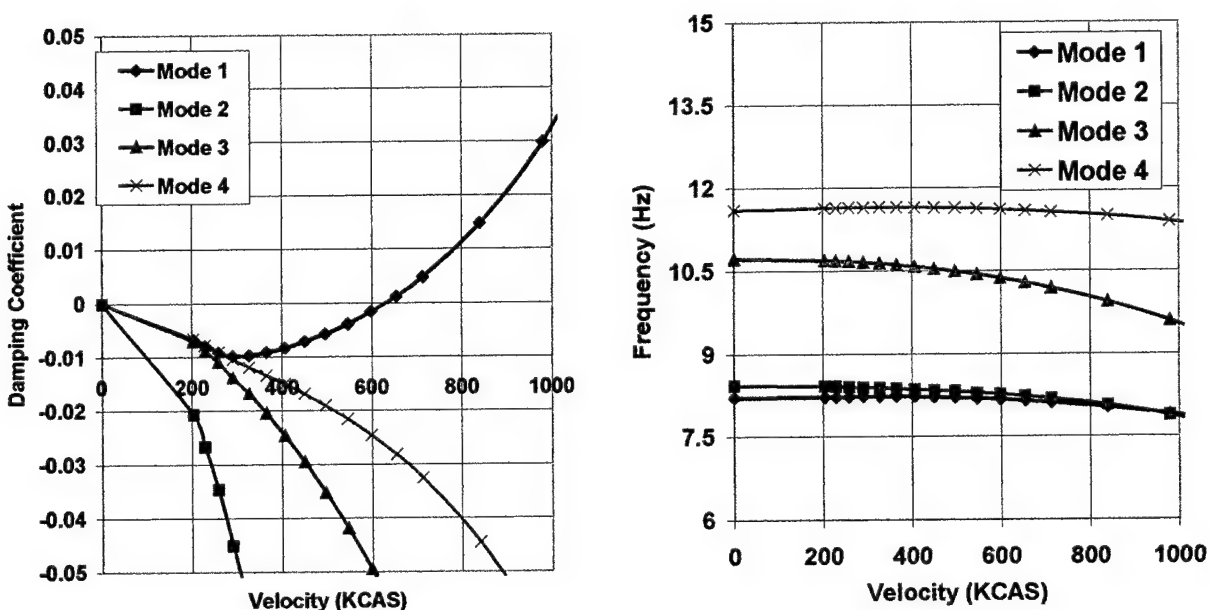


Figure 6.12 The Flutter V-g and V-f Plots of the Whole Aircraft Model with Underwing Stores at $M = 0.9$ Using the Nonlinear Aerodynamic Approach.

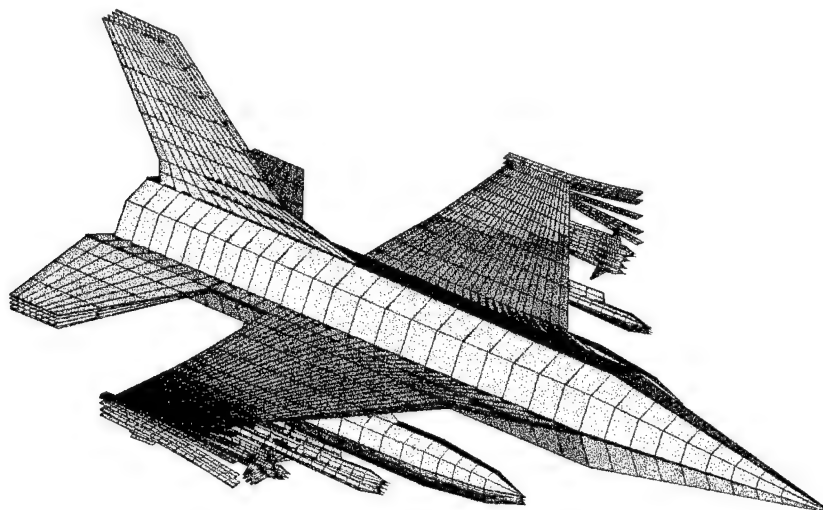


Figure 6.13 The Flutter Mode Shape of the Whole Aircraft Model with Underwing Stores at $M = 0.9$ Calculated Using the Non Linear Aerodynamic Method.

6.3.2 Aerodynamic Model # 3 at $M = 0.80 - 1.05$

In order to correlate the numerical predictions with the flight test data, the calculation for the nonlinear aerodynamic approach was repeated for several Mach numbers, namely $M = 0.80$, 0.90 , 0.95 , 0.98 , and 1.05 . The rigid body modes were included in the calculations. Figure 6.14 shows the flutter solution represented by the damping coefficient as a function of Mach number for several altitudes. Table 6.3 shows the critical speed and frequency for each Mach number. The results presented in Fig 6.14. indicate that:

- ZTAIC, i.e. the nonlinear aerodynamic approach, predicts the hump flutter modes in all altitudes, i.e. the aeroelastic system is unstable before $M = 0.95$, but becomes stable between $M=0.95$ and $M=1.0$.
- Similar to the classical flutter and the typical LCO cases, the on-set of LCO is very sensitive to the linear structural damping level. But, because of the sudden increase of the stable damping at $M=0.98$, the condition where LCO disappears is relatively insensitive to the structural damping.
- The above shows that indeed ZTAIC can provide correct trend for predicting the non-typical LCO case.

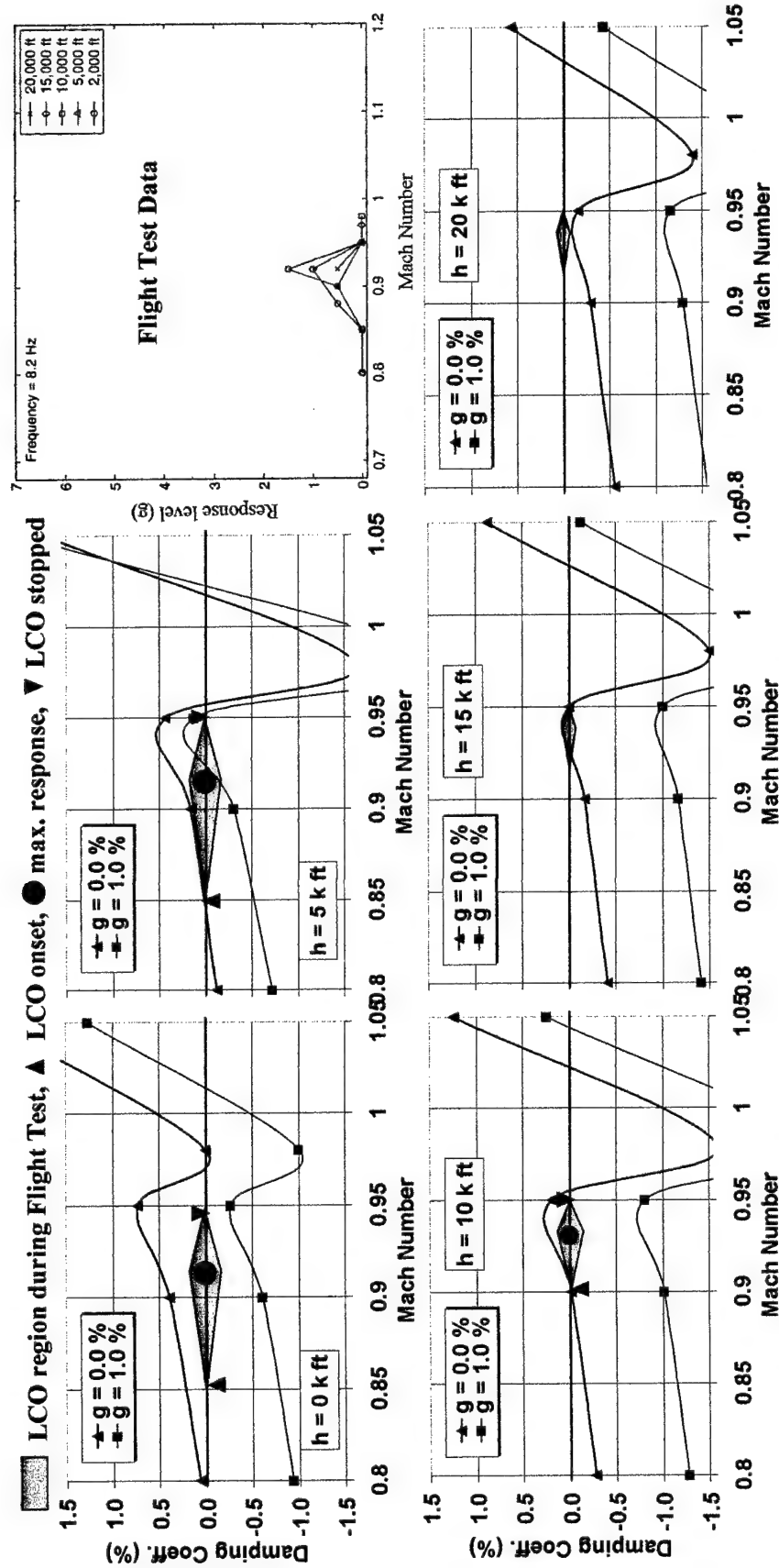


Figure 6.14 The Correlation between the Flutter Prediction using the Nonlinear Aerodynamic Approach (ZTAIC) and the Flight Test Data.

**Table 6.3 Critical speed and Frequency Using ZTAIC
(Nonlinear Aerodynamic Approach).**

<i>Mach Number</i>	<i>Damping Coeff. g (%)</i>	<i>Flutter Speed (KCAS)</i>	<i>Flutter Frequency (Hz)</i>
0.80	0.0	616	8.19
	1.0	752	8.12
0.90	0.0	630	8.16
	1.0	595	8.18
0.95	0.0	475	8.18
	1.0	672	8.09
0.98	0.0	1127	8.00
	1.0	1195	8.00
1.05	0.0	365	8.21
	1.0	543	8.16

SECTION 7

CONCLUSIONS AND FUTURE WORK

We have successfully investigated the accuracy of the ZAERO aeroelastic software system to predict various types of flutter and limit cycle oscillations (LCO) and developed a massive store management (MSM) system as a platform for a rapid assessment of flutter/LCO (RAFEL) software system for massive aircraft/store configurations.

To test the capability of ZAERO, a number of aircraft/store configurations with various structure and aerodynamic modeling are used in subsonic, transonic and supersonic flight regimes using linear and nonlinear unsteady aerodynamic procedures of ZAERO. Three different F-16 with store configurations were used to identify various categories of aeroelastic instability responses including classical flutter, typical LCO and non-typical LCO. According to Reference 1, these categories are representative of the wide variety of aeroelastic responses encountered by fighter aircraft with external stores.

To accurately predict the flutter/LCO onset speed and frequency at various flight altitudes, the matched point option of the g-method, a robust aeroelastic solver of ZAERO, was used. The procedure is important to correlate directly the flutter/LCO prediction in terms of flight altitude and Mach number with the flight test data.

The influence of structural rigid body modes on aeroelastic instability was investigated. The result shows that the influence is small for classical flutter and typical LCO cases, but can be significant for the non-typical LCO case. The inclusion of the structural rigid body modes in the aeroelastic analysis adds very small fraction of computational time but increase the accuracy of the result. Therefore, it is recommended to include the rigid body modes in the flutter/LCO prediction.

The influence of linear and nonlinear unsteady aerodynamic methods to discern differences between classical flutter, typical LCO and non-typical LCO was investigated. By using ZONA6/ZONA7 of ZAERO for a linear aerodynamic approach, the classical flutter case has been successfully identified. By using ZTAIC of ZAERO for a nonlinear aerodynamic approach, the differences between typical and non-typical LCO cases as well as classical flutter case have been successfully predicted including the oscillation frequency and onset velocity of the instability response.

The influence of various aerodynamic modeling of stores and whole aircraft, including fuselage, wing and horizontal/vertical tails, was investigated. The simplest aerodynamic model, i.e. the wing with tip launcher only, is capable to identify the oscillation frequency of flutter/LCO, but fails to predict the onset velocity. The use of more refined aerodynamic model including the whole aircraft and stores successfully improves the prediction and provides a well correlation with the flight test data. Therefore, the store aerodynamic modeling is important for accurate prediction of the flutter/LCO.

To anticipate the increase of computational time due to the additional aerodynamic model of massive aircraft/store configurations, a rapid aeroelastic computational scheme was designed using ZAERO as the basic software system. The rapid computational scheme is based on the strategy to re-use the aerodynamic influence coefficient (AIC) data, which is the most time consuming part in aeroelastic computation, and based on an efficient massive data management system to rapidly store and recall the AIC data. A scheme to utilize various parts of ZAERO, including ZONA6, ZONA7, ZTAIC, the g-method package and spline modules, has been designed to substantially increase the computational efficiency of ZAERO for the massive aircraft/store flutter/LCO assessment.

The achievement of the Phase I objectives has paved the way and has provided considerable technical insight for future implementation of the RAFEL software system in aircraft/store flutter clearance. Consequently, it leads to a well-conceived plan for a Phase II development. The proposed tasks to be conducted in Phase II include:

Implementation of the proposed RAFEL software system:

- Develop an off-line software to generate invariant AIC matrices of aircraft and stores, set up corresponding finite element models and spline input, and save the data on a permanent data base.
- Develop an online software that is driven by the GUI (Graphical User Interface) pre-processor to generate the input files of ZAERO and NASTRAN by retrieving the permanent database and can launch NASTRAN and ZAERO jobs.
- Develop an online software that is driven by the GUI post-processor to rapidly search for the critical flutter/LCO configurations and display the results.

Implementation of GUI system as the underlying software to

- Graphically display all available stores whose data have been saved in the data base.
- Allow users to graphically select arbitrary store configurations.
- Retrieve store data from the permanent database, assemble NASTRAN and ZAERO input files and launch NASTRAN and ZAERO input files.
- Process the ZAERO results of all aircraft/store configurations to search for the critical flutter/LCO cases and graphically display the results.

Implementation of parallel computing environment to accelerate computation

- A parallel virtual machine (PVM) software system can establish a network system linking all computers/CPU's.
- The PVM system allows an optimum distribution of jobs on each CPU to accelerate the computation.
- No user interaction is required since the parallel computing environment is fully automated system.

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Appendix A. **Structural Finite Element Data for Classical Flutter Case**

```

ID IMTAS BLOCK 40 F-16 FLUTTER FEM
SOL 103
TIME 20
$
CEWD
$
TITLE=F-16 1/2 AIRPLANE FINITE ELEMENT MODEL FOR FLUTTER ANALYSIS
SUBTI=ANTI-SYMMETRIC CENTERLINE BOUNDARY CONDITIONS //
LABEL=CONFIG 5 = MA41
DISP=ALL
ECHO=SORT
$ DMIG VERTICAL TAIL STIFFNESS MATRIX
KZGG=VTAIL
$ EIGENVALUE EXTRACTION
METHOD=1
$ SYMMETRIC B.C. / SPC=2 FOR ANTISYMMETRIC
SPC=2
$
$ SET 203022=GRIDS USED IN FLUTTER ANALYSIS.
$ ADD GRIDS 801 THROUGH 814 FOR DYNAMIC RESPONSE.
$
SET 203022=
2, 3, 4, 5, 6,
9, 11, 13, 15, 17,
19, 20, 21, 25, 29,
33, 39, 44, 47, 51,
52, 53, 56, 60, 61,
62, 64, 65, 68, 72,
73, 74, 75, 77, 78,
81, 85, 86, 87, 89,
90, 91, 92, 93, 95,
102, 103, 104, 105, 106,
107, 108, 109, 110, 111,
112, 113, 122, 123, 124,
128, 129, 130, 131, 132,
133, 3004, 3006, 3009
$ AIM-9/16S200 OR 16S200 ON TIP
$
OUTPUT(PLOT)
CSCALE=1.8
PAPER SIZE=26. BY 20.
$
$ SET 10=ELEMENTS USED IN MODE PLOTS
$
$ FUSELAGE CENTERLINE
SET 10= 1 THRU 26,
$ WING BOX
1001 THRU 1005,
1007,1010 THRU 1013,
1020,1023 THRU 1025,
1031,1034,1036,1043,1045,
1046,1048 THRU 1054,
1056 THRU 1062,
1071 THRU 1074,
1078,1079,1080,
1086 THRU 1090,
1099,1100,1101,
1075,1076,1077,
1081 THRU 1085,
1091 THRU 1097,
1102 THRU 1111,
1116 THRU 1125,
1126,1127,1128,
$ LEADING EDGE FLAP / 1258 ACTUATOR
1131 THRU 1134,
1136,1137,1138,
1140,1141,1142,
1144,1145,1146,
1148 THRU 1151,
1152 THRU 1171,
$ FLAPERON
1181 THRU 1185,
1187 THRU 1189,
1190 THRU 1194,
1196 THRU 1203,
1205 THRU 1207,
1209 THRU 1220,
1231 THRU 1238,
1251 THRU 1258,
1261 THRU 1268,
$ HORIZONTAL TAIL
2001 THRU 2058,
$ VERTICAL TAIL
2401 THRU 2460,
$ 16S200 // STATION 1,9
3003 THRU 3009,
$ AIM-9L // STATION 1,9
3014,3015
$
$ MAXIMUM DEFORMATION 35.
AXES MX,MY,Z
VIEW 60.0,30.,0.
FIND SCALE ORIGIN 10 SET 10
PLOT MODAL DEFO 0 SET 10 ORIGIN 10
$
$
BEGIN BULK
ASET 3500 123456
ASET 3501 123456
ASET1 1 163 153 154 155 156 71 286
ASET1 1 267
ASET1 1 284 281
ASET1 1 367 408 368 359 384
ASET1 1 373 364 381 383

```

```

ASET1 1 386 391 371 362 387 392 393
ASET1 1 389 369 360 385 390 370 361
ASET1 1 410
ASET1 3 6 17 5 15 4 13 3
ASET1 3 11 2 9
ASET1 3 19 72 20 60 73 21 61
ASET1 3 39 47 56 68 81 129
ASET1 3 74 51 62 75 26 52 64
ASET1 3 77 29 44 53 65 78 33
ASET1 3 85 86 87 88
ASET1 3 90 103 109 89 102 108
ASET1 3 95 107 113 93 106 112 124
ASET1 3 130 133 92 105 111 123 129
ASET1 3 132 91 104 110 122 128 131
ASET1 3 233
ASET1 3 251 THRU 266
ASET1 3 3017 3019 3022
ASET1 5 153 154 155 156 71 286 284
ASET1 5 410
ASET1 5 459
ASET1 6 437 281 410
ASET1 6 458
ASET1 3456 3018
CBAR 27 27 284 410 1. 1. 0.
CBAR 2401 2401 407 367 0. 1. 1.
CBAR 2402 2402 367 368 0. 1. 1.
CBAR 2403 2403 368 369 0. 1. 1.
CBAR 2404 2404 369 370 0. 1. 1.
CBAR 2405 2405 370 371 0. 1. 1.
CBAR 2406 2406 371 372 0. 1. 1.
CBAR 2407 2407 372 373 0. 1. 1.
CBAR 2408 2408 357 358 0. 1. 1.
CBAR 2409 2409 358 359 0. 1. 1.
CBAR 2410 2410 359 360 0. 1. 1.
CBAR 2411 2411 360 361 0. 1. 1.
CBAR 2412 2412 361 362 0. 1. 1.
CBAR 2413 2413 362 363 0. 1. 1.
CBAR 2414 2414 363 364 0. 1. 1.
CBAR 2415 2415 409 375 0. 1. 1.
CBAR 2416 2416 375 376 0. 1. 1.
CBAR 2417 2417 376 377 0. 1. 1.
CBAR 2418 2418 377 378 0. 1. 1.
CBAR 2419 2419 378 379 0. 1. 1.
CBAR 2420 2420 379 380 0. 1. 1.
CBAR 2421 2421 380 381 0. 1. 1.
CBAR 2422 2422 382 383 0. 1. 1.
CBAR 2423 2423 384 385 0. 1. 1.
CBAR 2424 2424 385 386 0. 1. 1.
CBAR 2425 2425 386 387 0. 1. 1.
CBAR 2426 2426 387 388 0. 1. 1.
CBAR 2427 2427 388 389 0. 1. 1.
CBAR 2428 2428 390 391 0. 1. 1.
CBAR 2429 2429 391 392 0. 1. 1.
CBAR 2430 2430 392 393 0. 1. 1.
CBAR 2431 2431 407 357 0. 1. 1.
CBAR 2432 2432 357 409 0. 1. 1.
CBAR 2433 2433 367 358 0. 1. 1.
CBAR 2434 2434 358 375 0. 1. 1.
CBAR 2435 2435 375 384 0. 1. 1.
CBAR 2436 2436 375 406 0. 1. 1.
CBAR 2437 2437 406 408 0. 1. 1.
CBAR 2438 2438 368 359 0. 1. 1.
CBAR 2439 2439 359 376 0. 1. 1.
CBAR 2440 2440 376 384 0. 1. 1.
CBAR 2441 2441 369 360 0. 1. 1.
CBAR 2442 2442 360 377 0. 1. 1.
CBAR 2443 2443 377 385 0. 1. 1.
CBAR 2444 2444 370 361 0. 1. 1.
CBAR 2445 2445 361 378 0. 1. 1.
CBAR 2446 2446 378 386 0. 1. 1.
CBAR 2447 2447 371 362 0. 1. 1.
CBAR 2448 2448 362 379 0. 1. 1.
CBAR 2449 2449 372 363 0. 1. 1.
CBAR 2450 2450 363 380 0. 1. 1.
CBAR 2451 2451 380 382 0. 1. 1.
CBAR 2452 2452 380 388 0. 1. 1.
CBAR 2453 2453 373 364 0. 1. 1.
CBAR 2454 2454 364 381 0. 1. 1.
CBAR 2455 2455 381 383 0. 1. 1.
CBAR 2456 2456 384 389 0. 1. 1.
CBAR 2457 2457 385 390 0. 1. 1.
CBAR 2458 2458 386 391 0. 1. 1.
CBAR 2459 2459 387 392 0. 1. 1.
CBAR 2460 2460 388 393 0. 1. 1.
CBAR 3502 3502 3500 52 1. 1. 0.
CBAR 3503 3502 3501 52 1. 1. 0.
CBEAM 1 1 163 164 1. 0. 0.
CBEAM 2 2 164 153 1. 0. 0.
CBEAM 3 3 267 154 1. 0. 0.
CBEAM 4 4 154 155 1. 0. 0.
CBEAM 5 5 155 156 1. 0. 0.
CBEAM 6 6 268 36 1. 0. 0.
CBEAM 7 7 36 42 1. 0. 0.
CBEAM 8 8 42 50 1. 0. 0.
CBEAM 9 9 50 437 1. 0. 0.
CBEAM 10 10 437 59 1. 0. 0.
CBEAM 11 11 59 431 1. 0. 0.
CBEAM 12 12 431 71 1. 0. 0.
CBEAM 13 13 71 84 1. 0. 0.
CBEAM 14 14 84 298 1. 0. 0.
CBEAM 15 15 298 286 1. 0. 0.
CBEAM 16 16 286 117 1. 0. 0.

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CBEAM	17	17	117	285	1.	1.	0.
CBEAM	18	18	285	283	1.	1.	0.
CBEAM	19	19	283	284	1.	1.	0.
CBEAM	20	20	284	282	1.	1.	0.
CBEAM	21	21	282	281	1.	1.	0.
CBEAM	22	22	281	405	1.	0.	0.
CBEAM	31	31	36	35	1.	1.	0.
CBEAM	32	32	42	41	1.	1.	0.
CBEAM	33	33	50	49	1.	1.	0.
CBEAM	34	34	59	58	1.	1.	0.
CBEAM	35	35	71	70	1.	1.	0.
CBEAM	36	36	84	83	1.	1.	0.
CBEAM	37	37	117	116	1.	1.	0.
CBEAM	38	38	34	31	1.	1.	0.
CBEAM	39	39	40	37	1.	1.	0.
CBEAM	40	40	48	45	1.	1.	0.
CBEAM	41	41	57	54	1.	1.	0.
CBEAM	42	42	69	66	1.	1.	0.
CBEAM	43	43	82	94	1.	1.	0.
CBEAM	44	44	94	118	1.	1.	0.
CBEAM	45	45	118	121	1.	1.	0.
CBEAM	46	46	115	79	1.	1.	0.
CBEAM	47	47	79	120	1.	1.	0.
CBEAM	48	48	120	114	1.	1.	0.
CBEAM	49	49	31	37	1.	1.	0.
+49BM	46						
CBEAM	50	50	37	45	1.	1.	0.
CBEAM	51	51	45	54	1.	1.	0.
CBEAM	52	52	54	66	1.	1.	0.
CBEAM	53	53	66	121	1.	1.	0.
+53BM	54	456					
CBEAM	54	54	121	114	1.	1.	0.
+54BM	456						
CBEAM	55	55	118	119	1.	1.	0.
CBEAM	56	56	119	120	1.	1.	0.
CBEAM	57	57	94	79	1.	1.	0.
CBEAM	141	141	467	274	1.	1.	0.
CBEAM	142	142	274	465	1.	1.	0.
CBEAM	143	143	465	275	1.	1.	0.
CBEAM	144	144	275	278	1.	1.	0.
CBEAM	145	145	278	280	1.	1.	0.
CBEAM	146	146	280	292	1.	1.	0.
CBEAM	147	147	292	114	1.	1.	0.
+147BM	456						
CBEAM	148	148	466	273	1.	1.	0.
CBEAM	149	149	273	464	1.	1.	0.
CBEAM	150	150	464	276	1.	1.	0.
CBEAM	151	151	276	279	1.	1.	0.
CBEAM	152	152	279	290	1.	1.	0.
CBEAM	153	153	290	293	1.	1.	0.
CBEAM	154	154	293	79	1.	1.	0.
+154BM	456						
CBEAM	160	160	295	300	1.	1.	0.
CBEAM	161	161	117	300	1.	1.	0.
CBEAM	162	162	300	79	1.	1.	0.
CBEAM	163	163	79	114	1.	1.	0.
CBEAM	164	164	283	295	1.	1.	0.
CBEAM	165	165	295	294	1.	1.	0.
CBEAM	166	166	293	292	1.	1.	0.
CBEAM	167	167	282	291	1.	1.	0.
CBEAM	168	168	290	280	1.	1.	0.
CBEAM	169	169	279	271	1.	1.	0.
+169BM	456						
CBEAM	170	170	271	278	1.	1.	0.
+170BM	56						
CBEAM	171	171	281	277	1.	1.	0.
CBEAM	172	172	276	275	1.	1.	0.
CBEAM	173	173	464	465	1.	1.	0.
CBEAM	174	174	466	467	1.	1.	0.
CBEAM	175	175	271	272	1.	1.	0.
+175BM	46						
CBEAM	176	176	273	241	1.	1.	0.
CBEAM	177	177	241	299	1.	1.	0.
CBEAM	178	178	299	272	1.	1.	0.
CBEAM	179	179	272	274	1.	1.	0.
CBEAM	180	180	274	233	1.	1.	0.
CBEAM	181	181	195	296	1.	1.	0.
+181BM	56						
CBEAM	182	182	296	196	1.	1.	0.
+182BM	56						
CBEAM	1001	1001	33	39	1.	0.	0.
CBEAM	1002	1002	39	47	1.	0.	0.
CBEAM	1003	1003	47	56	1.	0.	0.
CBEAM	1004	1004	56	68	1.	0.	0.
CBEAM	1005	1005	68	81	1.	0.	0.
CBEAM	1007	1007	32	38	1.	0.	0.
CBEAM	1009	1009	30	38	1.	0.	0.
CBEAM	1010	1010	38	46	1.	0.	0.
CBEAM	1011	1011	46	55	1.	0.	0.
CBEAM	1012	1012	55	67	1.	0.	0.
CBEAM	1013	1013	67	80	1.	0.	0.
CBEAM	1014	1014	181	182	1.	0.	0.
CBEAM	1015	1015	182	183	1.	0.	0.
CBEAM	1016	1016	183	184	1.	0.	0.
CBEAM	1017	1017	184	185	1.	0.	0.
CBEAM	1018	1018	185	186	1.	0.	0.
CBEAM	1020	1020	29	44	1.	0.	0.
CBEAM	1022	1022	27	44	1.	0.	0.
CBEAM	1023	1023	44	53	1.	0.	0.
CBEAM	1024	1024	53	65	1.	0.	0.
CBEAM	1025	1025	65	78	1.	0.	0.
CBEAM	1026	1026	187	188	1.	0.	0.
+1026BM	56						
CBEAM	1027	1027	188	189	1.	0.	0.
CBEAM	1028	1028	189	190	1.	0.	0.
CBEAM	1029	1029	190	191	1.	0.	0.
CBEAM	1031	1031	26	52	1.	0.	0.
CBEAM	1033	1033	25	52	1.	0.	0.
CBEAM	1034	1034	52	64	1.	0.	0.
CBEAM	1035	1035	64	77	1.	0.	0.
CBEAM	1036	1036	77	1.	0.	0.	0.
CBEAM	1037	1037	245	77	1.	0.	0.
CBEAM	1038	1038	192	193	1.	0.	0.
CBEAM	1039	1039	193	63	1.	0.	0.

CBEAM	1040	1040	63	245	1.	0.	0.
CBEAM	1041	1041	245	76	1.	0.	0.
CBEAM	1043	1043	24	51	1.	0.	0.
CBEAM	1045	1045	23	51	1.	0.	0.
CBEAM	1046	1046	51	62	1.	0.	0.
CBEAM	1047	1047	22	62	1.	0.	0.
CBEAM	1048	1048	62	244	1.	0.	0.
CBEAM	1049	1049	244	75	1.	0.	0.
CBEAM	1050	1050	75	88	1.	0.	0.
CBEAM	1051	1051	21	61	1.	0.	0.
CBEAM	1052	1052	61	243	1.	0.	0.
CBEAM	1053	1053	243	74	1.	0.	0.
+1053BM	56						
CBEAM	1054	1054	74	87	1.	0.	0.
CBEAM	1056	1056	20	60	1.	0.	0.
CBEAM	1057	1057	60	242	1.	0.	0.
CBEAM	1058	1058	242	73	1.	0.	0.
+1058BM	56						
CBEAM	1059	1059	73	86	1.	0.	0.
CBEAM	1060	1060	19	143	1.	0.	0.
CBEAM	1061	1061	143	72	1.	0.	0.
CBEAM	1062	1062	72	85	1.	0.	0.
CBEAM	1071	1071	33	32	0.	1.	0.
CBEAM	1072	1072	32	30	0.	1.	0.
CBEAM	1073	1073	30	181	0.	1.	0.
CBEAM	1074	1074	181	29	0.	1.	0.
CBEAM	1075	1075	39	38	0.	1.	0.
CBEAM	1076	1076	38	182	0.	1.	0.
CBEAM	1077	1077	182	29	0.	1.	0.
CBEAM	1078	1078	29	27	0.	1.	0.
CBEAM	1079	1079	27	187	0.	1.	0.
CBEAM	1080	1080	187	26	0.	1.	0.
CBEAM	1081	1081	47	46	0.	1.	0.
CBEAM	1082	1082	46	183	0.	1.	0.
CBEAM	1083	1083	183	44	0.	1.	0.
CBEAM	1084	1084	44	188	0.	1.	0.
CBEAM	1085	1085	188	26	0.	1.	0.
CBEAM	1086	1086	26	25	0.	1.	0.
CBEAM	1087	1087	25	192	0.	1.	0.
CBEAM	1088	1088	192	24	0.	1.	0.
CBEAM	1089	1089	24	23	0.	1.	0.
CBEAM	1090	1090	23	22	0.	1.	0.
CBEAM	1091	1091	56	55	0.	1.	0.
CBEAM	1092	1092	55	184	0.	1.	0.
CBEAM	1093	1093	184	53	0.	1.	0.
CBEAM	1094	1094	53	189	0.	1.	0.
CBEAM	1095	1095	189	52	0.	1.	0.
CBEAM	1096	1096	52	193	0.	1.	0.
CBEAM	1097	1097	193	51	0.	1.	0.
CBEAM	1098	1098	51	22	0.	1.	0.
+1098BM	56						
CBEAM	1099	1099	22	21	0.	1.	0.
CBEAM	1100	1100	21	20	0.	1.	0.
CBEAM	1101	1101	20	19	0.	1.	0.
CBEAM	1102	1102	68	67	0.	1.	0.
CBEAM	1103	1103	67	185	0.	1.	0.
CBEAM	1104	1104	185	65	0.	1.	0.
CBEAM	1105	1105	65	190	0.	1.	0.
CBEAM	1106	1106	190	64	0.	1.	0.
CBEAM	1107	1107	64	63	0.	1.	0.
CBEAM	1108	1108	63	62	0.	1.	0.
CBEAM	1109	1109	62	61	0.	1.	0.
CBEAM	1110	1110	61	60	0.	1.	0.
CBEAM	1111	1111	60	19	0.	1.	0.
CBEAM	1112	1112	245	244	0.	1.	0.
CBEAM	1113	1113	244	243	0.	1.	0.
CBEAM	1114	1114	243	242	0.	1.	0.
CBEAM	1115	1115	242	143	0.	1.	0.
CBEAM	1116	1116	81	80	0.	1.	0.
CBEAM	1117	1117	80	186	0.	1.	0.
CBEAM	1118	1118	186	78	0.	1.	0.
CBEAM	1119	1119	78	191	0.	1.	0.
CBEAM	1120	1120	191	77	0.	1.	0.
CBEAM	1121	1121	77	76	0.	1.	0.
CBEAM	1122	1122	76	75	0.	1.	0.
CBEAM	1123	1123	75	74	0.	1.	0.
CBEAM	1124	1124	74	73	0.	1.	0.
CBEAM	1125	1125	73	72	0.	1.	0.
CBEAM	1126	1126	88	87	0.	1.	0.
CBEAM	1127	1127	87	86	0.	1.	0.
CBEAM	1128	1128	86	85	0.	1.	0.
CBEAM	1131	1131	7	18	1.	0.	0.
CBEAM	1132	1132	6	16	1.	0.	0.
CBEAM	1133	1133	16	17	1.	0.	0.
CBEAM	1134	1134	17	30	1.	0.	0.
+BM1134	5						
CBEAM	1135	1135	176	180	1.	0.	0.
CBEAM	1136	1136	5	14	1.	0.	0.
CBEAM	1137	1137	14	15	1.	0.	0.
CBEAM	1						

CBEAM	1159	1159	173	3	1.	0.	0.	
CBEAM	1160	1160	2	173	1.	0.	0.	
CBEAM	1161	1161	1	2	1.	0.	0.	
CBEAM	1162	1162	16	18	1.	0.	0.	
CBEAM	1163	1163	180	16	1.	0.	0.	
CBEAM	1164	1164	14	180	1.	0.	0.	
CBEAM	1165	1165	179	14	1.	0.	0.	
CBEAM	1166	1166	12	179	1.	0.	0.	
CBEAM	1167	1167	178	12	1.	0.	0.	
CBEAM	1168	1168	10	178	1.	0.	0.	
CBEAM	1169	1169	177	10	1.	0.	0.	
CBEAM	1170	1170	194	177	1.	0.	0.	
CBEAM	1171	1171	8	194	1.	0.	0.	
CBEAM	1181	1181	81	95	1.	0.	0.	
+BM1181	456							
CBEAM	1182	1182	95	142	1.	0.	0.	
CBEAM	1183	1183	142	101	1.	0.	0.	
CBEAM	1184	1184	101	107	1.	0.	0.	
CBEAM	1185	1185	107	113	1.	0.	0.	
CBEAM	1186	1186	93	141	1.	0.	0.	
CBEAM	1187	1187	141	100	1.	0.	0.	
CBEAM	1188	1188	100	106	1.	0.	0.	
CBEAM	1189	1189	106	112	1.	0.	0.	
CBEAM	1190	1190	186	124	1.	0.	0.	
+BM1190	456							
CBEAM	1191	1191	124	140	1.	0.	0.	
CBEAM	1192	1192	140	127	1.	0.	0.	
CBEAM	1193	1193	127	130	1.	0.	0.	
CBEAM	1194	1194	130	133	1.	0.	0.	
CBEAM	1195	1195	92	139	1.	0.	0.	
CBEAM	1196	1196	139	99	1.	0.	0.	
CBEAM	1197	1197	99	105	1.	0.	0.	
CBEAM	1198	1198	105	111	1.	0.	0.	
CBEAM	1199	1199	191	123	1.	0.	0.	
+BM1199	456							
CBEAM	1200	1200	123	138	1.	0.	0.	
CBEAM	1201	1201	138	126	1.	0.	0.	
CBEAM	1202	1202	126	129	1.	0.	0.	
CBEAM	1203	1203	129	132	1.	0.	0.	
CBEAM	1204	1204	91	137	1.	0.	0.	
CBEAM	1205	1205	137	98	1.	0.	0.	
CBEAM	1206	1206	98	104	1.	0.	0.	
CBEAM	1207	1207	104	110	1.	0.	0.	
CBEAM	1208	1208	122	136	1.	0.	0.	
CBEAM	1209	1209	136	125	1.	0.	0.	
CBEAM	1210	1210	125	128	1.	0.	0.	
CBEAM	1211	1211	128	131	1.	0.	0.	
CBEAM	1212	1212	76	90	1.	0.	0.	
+BM1212	456							
CBEAM	1213	1213	90	135	1.	0.	0.	
CBEAM	1214	1214	135	97	1.	0.	0.	
CBEAM	1215	1215	97	103	1.	0.	0.	
CBEAM	1216	1216	103	109	1.	0.	0.	
CBEAM	1217	1217	89	134	1.	0.	0.	
CBEAM	1218	1218	134	96	1.	0.	0.	
CBEAM	1219	1219	96	102	1.	0.	0.	
CBEAM	1220	1220	102	108	1.	0.	0.	
CBEAM	1231	1231	141	142	1.	0.	0.	
CBEAM	1232	1232	140	141	1.	0.	0.	
CBEAM	1233	1233	139	140	1.	0.	0.	
CBEAM	1234	1234	138	139	1.	0.	0.	
CBEAM	1235	1235	137	138	1.	0.	0.	
CBEAM	1236	1236	136	137	1.	0.	0.	
CBEAM	1237	1237	135	136	1.	0.	0.	
CBEAM	1238	1238	134	135	1.	0.	0.	
CBEAM	1241	1241	100	101	1.	0.	0.	
CBEAM	1242	1242	127	100	1.	0.	0.	
CBEAM	1243	1243	99	127	1.	0.	0.	
CBEAM	1244	1244	126	99	1.	0.	0.	
CBEAM	1245	1245	98	126	1.	0.	0.	
CBEAM	1246	1246	125	98	1.	0.	0.	
CBEAM	1247	1247	97	125	1.	0.	0.	
CBEAM	1248	1248	96	97	1.	0.	0.	
CBEAM	1251	1251	106	107	1.	0.	0.	
CBEAM	1252	1252	130	106	1.	0.	0.	
CBEAM	1253	1253	105	130	1.	0.	0.	
CBEAM	1254	1254	129	105	1.	0.	0.	
CBEAM	1255	1255	104	129	1.	0.	0.	
CBEAM	1256	1256	128	104	1.	0.	0.	
CBEAM	1257	1257	103	128	1.	0.	0.	
CBEAM	1258	1258	102	103	1.	0.	0.	
CBEAM	1261	1261	112	113	1.	0.	0.	
CBEAM	1262	1262	133	112	1.	0.	0.	
CBEAM	1263	1263	111	133	1.	0.	0.	
CBEAM	1264	1264	132	111	1.	0.	0.	
CBEAM	1265	1265	110	132	1.	0.	0.	
CBEAM	1266	1266	131	110	1.	0.	0.	
CBEAM	1267	1267	109	131	1.	0.	0.	
CBEAM	1268	1268	108	109	1.	0.	0.	
CBEAM	2001	2001	251	506	1.	1.	0.	
+BM2001	456							
CBEAM	2002	2002	506	233	1.	1.	0.	
CBEAM	2003	2003	233	517	1.	1.	0.	
CBEAM	2004	2004	517	262	1.	1.	0.	
+BM2004	456							
CBEAM	2005	2005	252	507	1.	1.	0.	
+BM2005	456							
CBEAM	2006	2006	507	257	1.	1.	0.	
CBEAM	2007	2007	257	518	1.	1.	0.	
CBEAM	2008	2008	518	262	1.	1.	0.	
+BM2008	456							
CBEAM	2009	2009	253	508	1.	1.	0.	
+BM2009	456							
CBEAM	2010	2010	508	258	1.	1.	0.	
CBEAM	2011	2011	258	519	1.	1.	0.	
CBEAM	2012	2012	519	263	1.	1.	0.	
+BM2012	456							
CBEAM	2013	2013	254	509	1.	1.	0.	
+BM2013	456							
CBEAM	2014	2014	509	259	1.	1.	0.	
CBEAM	2015	2015	259	520	1.	1.	0.	
CBEAM	2016	2016	520	264	1.	1.	0.	
+BM2016	456							
CBEAM	2017	2017	255	510	1.	1.	0.	

+BM1181

+BM1190

+BM1199

+BM1212

+BM2001

+BM2004

+BM2005

+BM2008

+BM2009

+BM2012

+BM2013

+BM2016

+BM2017

+BM2017	456							
CBEAM	2018	2018	510	260	1.	1.	0.	
CBEAM	2019	2019	260	521	1.	1.	0.	
CBEAM	2020	2020	521	265	1.	1.	0.	+BM2020
+BM2020	456							
CBEAM	2021	2021	256	511	1.	1.	0.	+BM2021
+BM2021	456							
CBEAM	2022	2022	511	261	1.	1.	0.	+BM2022
+BM2022	456							
CBEAM	2023	2023	261	522	1.	1.	0.	+BM2023
+BM2023	456							
CBEAM	2024	2024	522	266	1.	1.	0.	+BM2024
+BM2024	456							
CBEAM	2031	2031	251	501	1.	1.	0.	+BM2031
+BM2031	456							
CBEAM	2032	2032	501	252	1.	1.	0.	
CBEAM	2033	2033	252	502	1.	1.	0.	
CBEAM	2034	2034	502	253	1.	1.	0.	
CBEAM	2035	2035	253	503	1.	1.	0.	
CBEAM	2036	2036	503	254	1.	1.	0.	
CBEAM	2037	2037	254	504	1.	1.	0.	
CBEAM	2038	2038	504	255	1.	1.	0.	
CBEAM	2039	2039	255	505	1.	1.	0.	
CBEAM	2040	2040	505	256	1.	1.	0.	+BM2040
+BM2040	456							
CBEAM	2041	2041	233	512	1.	1.	0.	
CBEAM	2042	2042	512	257	1.	1.	0.	
CBEAM	2043	2043	257	513	1.	1.	0.	
CBEAM	2044	2044	513	258	1.	1.	0.	
CBEAM	2045	2045	258	514	1.	1.	0.	
CBEAM	2046	2046	514	259	1.	1.	0.	
CBEAM	2047	2047	259	515	1.	1.	0.	
CBEAM	2048	2048	515	260	1.	1.	0.	
CBEAM	2049	2049	260	516	1.	1.	0.	
CBEAM	2050	2050	516	261	1.	1.	0.	+BM2050
+BM2050	456							
CBEAM	2051	2051	262	523	1.	1.	0.	+BM2051
+BM2051	456							
CBEAM	2052	2052	523	263	1.	1.	0.	
CBEAM	2053	2053	263	524	1.	1.	0.	
CBEAM	2054	2054	524	264	1.	1.	0.	
CBEAM	2055	2055	264	525	1.	1.	0.	
CBEAM	2056	2056	525	265	1.	1.	0.	
CBEAM	2057	2057	265	526	1.	1.	0.	
CBEAM	2058	2058	526	266	1.	1.	0.	+BM2058
+BM2058	456							
CBEAM	3026	3026	19	3020	0.	1.	0.	
CBEAM	3027	3027	3016	3021	0.	1.	0.	
CBEAM	3028	3028	3017	3018	1.	0.	0.	
CBEAM	3029	3029	3018	3019	1.	0.	0.	
CBEAM	3030	3030	3019	3020	1.	0.	0.	
CBEAM	3031	3031	3020	3021	1.	0.	0.	
CBEAM	3032	3032	3021	3022	1.	0.	0.	+3032
+3032	5							
CBEAM	5002	5002	153	267	1.	0.	0.	
CBEAM	5051	5051	156	458	1.	0.	0.	
CBEAM	5052	5052	458	459	1.	0.	0.	
CBEAM	5053	5053	459	268	1.	0.	0.	
CELAS2	61	36.6E6	34	5	35	5		
CELAS2	62	71.0E6	40	5	41	5		
CELAS2	63	94.1E6	48	5	49	5		
CELAS2	64	132.4E6	57	5	58	5		
CELAS2	65	110.0E6	69	5	70	5		
CELAS2	66	51.7E6	82	5	83	5		
CELAS2	67	5.0E6	115	5	116	5		
CELAS2	191	11.25E6	277	5	276	5		
CELAS2	192	22.0E6	291	5	290	5		
CELAS2	193	9.68E6	294	5	293	5		
CELAS2	194	156E10	298	3	195	3		
CELAS2	195	67829.	284	3	196	3		
CELAS2	1172	5650000.	17	4	30	4		
CELAS2	1173	5590000.	15	4	27	4		
CELAS2	1174	1600000.	13	4	25	4		
CELAS2	1175	2030000.	11	4	23	4		
CELAS2	1221	3307000.	142	4	141	4		
CELAS2	1222	268300.	141	4	140	4		
CELAS2	1223	137300.	140	4	139	4		
CELAS2	1224	105200.	139	4	138	4		
CELAS2	1225	85600.	138	4	137	4		
CELAS2	1226	69900.	137	4	136	4		
CELAS2	1227	57700.	136	4	135	4		
CELAS2	1228	40000.	135	4	134	4		
CELAS2	1229	6229750.	142	4	119	4		
CONM1	301	19	0					+301
+301	9.565							
CONM1	302	72	0					+302
+302	6.770							
CONM1	303	20	0					+303
+303	7.972							
CONM1	304	60	0					+304
+304	10.110							
CONM1	305	73	0					+305
+305	7.755							
CONM1	306	21	0					+306
+306	13.712							
CONM1	307	61	0					+307
+307	20.285							
CONM1	308	74	0					+308
+308	9.982							
CONM1	309	51	0					+309
+309	32.156							
CONM1	310	62	0					+310
+310	25.281							
CONM1	311	75	0					+311
+311	14.285							
CONM1	312	26	0					+312
+312	42.942							
CONM1	313	52	0					+313
+313	57.288							
CONM1	314	64	0					+314
+314	46.648							
CONM1	315	77	0					+315
+315	20.983							
CONM1	316	29	0					+316

CSHEAR	77	71	2034	2040	2037	2031
CSHEAR	78	72	2040	2048	2045	2037
CSHEAR	79	73	2048	2057	2054	2045
CSHEAR	80	74	2057	2069	2066	2054
CSHEAR	81	75	2069	2082	2121	2066
CSHEAR	82	76	2094	2079	2114	2121
CSHEAR	201	201	1465	1464	1466	1467
CSHEAR	202	202	1275	1276	1464	1465
CSHEAR	203	203	1280	1290	1276	1275
CSHEAR	204	204	1114	1079	1293	1292
CSHEAR	205	201	2465	2464	2466	2467
CSHEAR	206	202	2275	2276	2464	2465
CSHEAR	207	203	2280	2290	2276	2275
CSHEAR	208	204	2114	2079	2293	2292
CSHEAR	642	642	1075	1088	1087	1074
CSHEAR	646	646	1074	1087	1086	1073
CSHEAR	650	650	1073	1086	1085	1072
CSHEAR	651	651	1007	1018	1016	1006
CSHEAR	652	652	1006	1016	1180	1176
CSHEAR	653	653	1176	1180	1014	1005
CSHEAR	654	654	1005	1014	1179	1175
CSHEAR	655	655	1175	1179	1012	1004
CSHEAR	656	656	1004	1012	1178	1174
CSHEAR	657	657	1174	1178	1010	1003
CSHEAR	658	658	1003	1010	1177	1173
CSHEAR	659	659	1173	1177	1194	1002
CSHEAR	660	660	1002	1194	1008	1001
CSHEAR	1642	642	2075	2088	2087	2074
CSHEAR	1646	646	2074	2087	2086	2073
CSHEAR	1650	650	2073	2086	2085	2072
CSHEAR	1651	651	2007	2018	2016	2006
CSHEAR	1652	652	2006	2016	2180	2176
CSHEAR	1653	653	2176	2180	2014	2005
CSHEAR	1654	654	2005	2014	2179	2175
CSHEAR	1655	655	2175	2179	2012	2004
CSHEAR	1656	656	2004	2012	2178	2174
CSHEAR	1657	657	2174	2178	2010	2003
CSHEAR	1658	658	2003	2010	2177	2173
CSHEAR	1659	659	2173	2177	2194	2002
CSHEAR	1660	660	2002	2194	2008	2001
CTRIA3	606	606	1032	1039	1030	
CTRIA3	612	612	1181	1182	1029	
CTRIA3	617	617	1029	1044	1027	
CTRIA3	622	622	1187	1188	1026	
CTRIA3	626	626	1026	1052	1025	
CTRIA3	629	629	1064	1245	1063	
CTRIA3	630	630	1064	1077	1245	
CTRIA3	631	631	1077	1076	1245	
CTRIA3	636	636	1051	1023	1024	
CTRIA3	637	637	1051	1022	1023	
CTRIA3	638	638	1062	1022	1051	
CTRIA3	647	647	1019	1020	1060	
CTRIA3	1606	606	2032	2038	2030	
CTRIA3	1612	612	2181	2182	2029	
CTRIA3	1617	617	2029	2044	2029	
CTRIA3	1622	622	2187	2188	2026	
CTRIA3	1626	626	2026	2052	2025	
CTRIA3	1629	629	2064	2245	2063	
CTRIA3	1630	630	2064	2077	2245	
CTRIA3	1631	631	2077	2076	2245	
CTRIA3	1636	636	2051	2023	2024	
CTRIA3	1637	637	2051	2022	2023	
CTRIA3	1638	638	2062	2022	2051	
CTRIA3	1647	647	2019	2020	2060	
CTRIA6	706	706	1262	1257	1263	1518 1512 1517 +706
+706	99.5					
CTRIA6	1706	706	2262	2257	2233	2518 2512 2517 +1706
+1706	99.5					
DMIG	*VTAIL	0	6	1	0	
DMIG	*VTAIL	357			1	*9001
*9001	357	1			0.127440E+06	
DMIG	*VTAIL	358			1	*9002
*9002	357	1			-.217072E+05	*9003
*9003	358	1			0.680871E+05	
DMIG	*VTAIL	359			1	*9004
*9004	357	1			0.352175E+03	*9005
*9005	358	1			-.193333E+05	*9006
*9006	359	1			0.717224E+05	
DMIG	*VTAIL	360			1	*9007
*9007	357	1			0.456481E+03	*9008
*9008	358	1			-.301624E+03	*9009
*9009	359	1			-.903472E+04	*9010
*9010	360	1			0.507642E+05	
DMIG	*VTAIL	361			1	*9011
*9011	357	1			-.131707E+02	*9012
*9012	358	1			0.315215E+03	*9013
*9013	359	1			-.103102E+04	*9014
*9014	360	1			-.504458E+04	*9015
*9015	361	1			0.468148E+05	
DMIG	*VTAIL	362			1	*9016
*9016	357	1			0.739752E+00	*9017
*9017	358	1			-.313943E+02	*9018
*9018	359	1			0.841453E+02	*9019
*9019	360	1			0.764191E+02	*9020
*9020	361	1			-.117072E+05	*9021
*9021	362	1			0.484915E+05	
DMIG	*VTAIL	363			1	*9022
*9022	357	1			0.363626E+00	*9023
*9023	358	1			-.206621E+01	*9024
*9024	359	1			0.170371E+02	*9025
*9025	360	1			-.128679E+03	*9026
*9026	361	1			0.142936E+04	*9027
*9027	362	1			-.141053E+05	*9028
*9028	363	1			0.334950E+05	
DMIG	*VTAIL	364			1	*9029
*9029	357	1			-.178665E+00	*9030
*9030	358	1			0.286879E+01	*9031
*9031	359	1			-.179730E+02	*9032
*9032	360	1			0.822153E+02	*9033
*9033	361	1			-.308830E+03	*9034
*9034	362	1			0.163581E+04	*9035
*9035	363	1			-.934300E+04	*9036
*9036	364	1			0.133364E+05	
DMIG	*VTAIL	367			1	*9037

*9037	357	1	0.156429E+04	*9038
*9038	358	1	-.126722E+05	*9039
*9039	359	1	-.249630E+02	*9040
*9040	360	1	0.252357E+03	*9041
*9041	361	1	-.348368E+01	*9042
*9042	362	1	0.213553E-02	*9043
*9043	363	1	0.287588E+00	*9044
*9044	364	1	0.573159E+05	*9045
*9045	367	1	1	
DMIG	*VTAIL	368	1	*9046
*9046	357	1	0.150006E+03	*9047
*9047	358	1	-.349447E+04	*9048
*9048	359	1	-.184666E+05	*9049
*9049	360	1	-.597411E+03	*9050
*9050	361	1	0.413201E+03	*9051
*9051	362	1	-.489800E+02	*9052
*9052	363	1	-.271009E+00	*9053
*9053	364	1	-.202789E+01	*9054
*9054	367	1	-.502776E+04	*9055
*9055	368	1	0.246725E+05	
DMIG	*VTAIL	369	1	*9056
*9056	357	1	0.292477E+03	*9057
*9057	358	1	0.106678E+04	*9058
*9058	359	1	-.372974E+04	*9059
*9059	360	1	-.163066E+05	*9060
*9060	361	1	-.720338E+03	*9061
*9061	362	1	0.400484E+03	*9062
*9062	363	1	0.516936E+00	*9063
*9063	364	1	-.141972E+02	*9064
*9064	367	1	0.245134E+03	*9065
*9065	368	1	-.625047E+04	*9066
*9066	369	1	0.208907E+05	
DMIG	*VTAIL	370	1	*9067
*9067	357	1	0.109520E+02	*9068
*9068	358	1	-.429165E+02	*9069
*9069	359	1	0.371999E+03	*9070
*9070	360	1	-.238343E+04	*9071
*9071	361	1	-.147446E+05	*9072
*9072	362	1	0.690143E+03	*9073
*9073	363	1	0.723676E+03	*9074
*9074	364	1	0.244021E+02	*9075
*9075	367	1	-.574195E+02	*9076
*9076	368	1	0.416297E+03	*9077
*9077	369	1	-.416404E+04	*9078
*9078	370	1	0.182966E+05	
DMIG	*VTAIL	371	1	*9079
*9079	357	1	-.319898E+00	*9080
*9080	358	1	-.105520E+02	*9081
*9081	359	1	0.537074E+02	*9082
*9082	360	1	0.115046E+03	*9083
*9083	361	1	-.455381E+03	*9084
*9084	362	1	-.131301E+05	*9085
*9085	363	1	0.208463E+04	*9086
*9086	364	1	-.271085E+03	*9087
*9087	367	1	0.123231E+02	*9088
*9088	368	1	-.234544E+03	*9089
*9089	369	1	0.874696E+03	*9090
*9090	370	1	-.744486E+04	*9091
*9091	371	1	0.300624E+05	
DMIG	*VTAIL	372	1	*9092
*9092	357	1	0.463602E+00	*9093
*9093	358	1	-.677371E+01	*9094
*9094	359	1	-.134083E+02	*9095
*9095	360	1	0.577641E+02	*9096
*9096	361	1	0.669330E+02	*9097
*9097	362	1	-.915742E+03	*9098
*9098	363	1	-.544593E+04	*9099
*9099	364	1	0.116824E+04	*9100
*9100	367	1	-.794538E+01	*9101
*9101	368	1	0.789193E+02	*9102
*9102	369	1	-.316023E+03	*9103
*9103	370	1	0.187626E+04	*9104
*9104	371	1	-.192798E+05	*9105
*9105	372	1	0.276338E+05	
DMIG	*VTAIL	373	1	*9106
*9106	357	1	0.484957E-02	*9107
*9107	358	1	0.440965E+00	*9108
*9108	359	1	-.691597E+00	*9109
*9109	360	1	-.875753E+00	*9110
*9110	361	1	0.363362E+02	*9111
*9111	362	1	0.411035E+01	*9112
*9112	363	1	-.163347E+04	*9113
*9113	364	1	-.258823E+04	*9114
*9114	367	1	0.345739E+00	*9115
*9115	368	1	-.422117E+01	*9116
*9116	369	1	0.101714E+02	*9117
*9117	370	1	-.633944E+02	*9118
*9118	371	1	0.270474E+04	*9119
*9119	372	1	-.730833E+04	*9120
*9120	373	1	0.703131E+04	
DMIG	*VTAIL	375	1	*9121
*9121	357	1	-.230046E+04	*9122
*9122	358	1	-.497159E+05	*9123
*9123	359	1	0.157355E+04	*9124
*9124	360	1	0.126726E+04	*9125
*9125	361	1	0.195618E+03	*9126
*9126	362	1	-.247898E+02	*9127
*9127	363	1	0.635440E+01	*9128
*9128	364	1	-.784751E+00	*9129
*9129	367	1	0.378804E+03	*9130
*9130	368	1	-.142639E+04	*9131
*9131	369	1	0.123205E+04	*9132

*9143	363	1	-243058E+02	*9144	380	1	-113558E+05	*9253
*9144	364	1	0.583973E+00	*9145	381	1	0.131793E+05	*9254
*9145	367	1	0.194037E+04	*9146	DMIG	*VTAIL	1	*9255
*9146	368	1	0.129929E+04	*9147	382	1	-211797E-02	*9256
*9147	369	1	0.235053E+04	*9148	358	1	0.196775E-01	*9257
*9148	370	1	0.756407E+03	*9149	359	1	-154809E+00	*9258
*9149	371	1	0.771059E+02	*9150	360	1	0.835219E+00	*9259
*9150	372	1	-600606E+00	*9151	361	1	0.461861E+01	*9260
*9151	373	1	0.197780E+01	*9152	362	1	0.180099E+02	*9261
*9152	375	1	-311505E+05	*9153	363	1	0.393001E+02	*9262
*9153	376	1	0.109246E+06		364	1	0.813303E+03	*9263
DMIG	*VTAIL	377	1		365	1	0.352611E-02	*9264
*9154	357	1	0.317443E+03	*9154	366	1	-218807E-01	*9265
*9155	358	1	0.219380E+04	*9155	367	1	0.135616E+00	*9266
*9156	359	1	0.208271E+04	*9156	368	1	0.447717E+01	*9267
*9157	360	1	-279276E+05	*9157	369	1	0.122064E+02	*9268
*9158	361	1	0.110103E+04	*9158	370	1	0.882424E+01	*9269
*9159	362	1	0.550257E+03	*9159	371	1	-479232E+00	*9270
*9160	363	1	0.811533E+02	*9160	372	1	0.117696E+02	*9271
*9161	364	1	-211053E+00	*9161	373	1	-551862E+00	*9272
*9162	367	1	0.716540E+03	*9162	374	1	0.991771E+00	*9273
*9163	368	1	0.171546E+04	*9163	375	1	-439420E+01	*9274
*9164	369	1	0.884905E+03	*9164	376	1	-139387E+03	*9275
*9165	370	1	0.158823E+04	*9165	377	1	0.164894E+04	*9276
*9166	371	1	0.561757E+03	*9166	378	1	-475810E+03	
*9167	372	1	0.690199E+02	*9167	379	1	0.179643E+04	
*9168	373	1	0.714289E+01	*9168	DMIG	*VTAIL	383	
*9169	375	1	0.363833E+04	*9169	357	1	0.311274E-03	*9277
*9170	376	1	-187741E+05	*9170	358	1	-479934E-02	*9278
*9171	377	1	0.775901E+05	*9171	359	1	0.182106E-01	*9279
DMIG	*VTAIL	378	1		360	1	-183852E+00	*9280
*9172	357	1	-110646E+02	*9172	361	1	-116182E+01	*9281
*9173	358	1	0.133390E+03	*9173	362	1	-255904E+01	*9282
*9174	359	1	0.711357E+03	*9174	363	1	0.112750E+01	*9283
*9175	360	1	0.202839E+04	*9175	364	1	-358622E+02	*9284
*9176	361	1	-261692E+05	*9176	365	1	-179107E-02	*9285
*9177	362	1	0.139574E+04	*9177	366	1	0.109064E-01	*9286
*9178	363	1	0.872899E+03	*9178	367	1	-797350E-01	*9287
*9179	364	1	0.177372E+03	*9179	368	1	-865236E+00	*9288
*9180	367	1	0.741269E+02	*9180	369	1	-258086E+01	*9289
*9181	368	1	0.487425E+03	*9181	370	1	-318473E+01	*9290
*9182	369	1	0.121023E+04	*9182	371	1	-249386E+01	*9291
*9183	370	1	0.188910E+04	*9183	372	1	0.754849E-01	*9292
*9184	371	1	0.140030E+04	*9184	373	1	-271080E+00	*9293
*9185	372	1	0.265625E+03	*9185	374	1	0.703442E+00	*9294
*9186	373	1	0.127903E+03	*9186	375	1	-611849E-01	*9295
*9187	375	1	-234087E+03	*9187	376	1	0.611220E+02	*9296
*9188	376	1	0.178520E+04	*9188	377	1	0.131850E+04	*9297
*9189	377	1	-113866E+05	*9189	378	1	-653645E+03	*9298
*9190	378	1	0.701957E+05	*9190	379	1	-643081E+03	*9299
DMIG	*VTAIL	379	1		380	1	0.830302E+03	*9300
*9191	357	1	0.550979E+00	*9191	381	1	0.265363E+05	*9301
*9192	358	1	-383492E+02	*9192	382	1	0.282354E+05	*9302
*9193	359	1	0.749947E+02	*9193	383	1	-948610E+04	*9303
*9194	360	1	0.542347E+03	*9194	384	1	-219314E+04	*9304
*9195	361	1	0.295398E+04	*9195	385	1	-475010E+03	*9305
*9196	362	1	-156110E+05	*9196	386	1	0.553337E+02	*9306
*9197	363	1	0.237945E+03	*9197	387	1	0.194540E+01	*9307
*9198	364	1	0.100000E+04	*9198	388	1	-384202E+01	*9308
*9199	367	1	-853152E+01	*9199	389	1	0.284832E+04	*9309
*9200	368	1	0.224612E+02	*9200	390	1	-116448E+04	*9310
*9201	369	1	0.450535E+03	*9201	391	1	-338989E+04	*9311
*9202	370	1	0.123586E+04	*9202	392	1	-157428E+03	*9312
*9203	371	1	0.192022E+04	*9203	393	1	0.485381E+02	*9313
*9204	372	1	0.747017E+03	*9204	394	1	-926415E+01	*9314
*9205	373	1	0.679657E+03	*9205	395	1	-122039E+01	*9315
*9206	375	1	0.693183E+02	*9206	396	1	-569831E+06	*9316
*9207	376	1	-525747E+03	*9207	397	1	-948471E+05	*9317
*9208	377	1	0.193872E+04	*9208	398	1	-370924E+04	*9318
*9209	378	1	-143803E+05	*9209	399	1	-157310E+03	*9319
*9210	379	1	0.259716E+05	*9210	400	1	0.111069E+03	*9320
DMIG	*VTAIL	380	1		401	1	-182484E+02	*9321
*9211	357	1	-681648E-01	*9211	402	1	0.664130E+01	*9322
*9212	358	1	0.121017E+01	*9212	403	1	0.991842E-01	*9323
*9213	359	1	-388187E+01	*9213	404	1	0.593778E-01	*9324
*9214	360	1	0.424170E+02	*9214	405	1	0.149748E+07	*9325
*9215	361	1	0.491571E+03	*9215	406	1	0.710800E+01	*9326
*9216	362	1	0.156462E+04	*9216	407	1	0.285959E+03	*9327
*9217	363	1	-188062E+05	*9217	408	1	-443238E+03	*9328
*9218	364	1	-222663E+04	*9218	409	1	0.490161E+04	*9329
*9219	367	1	0.511802E+00	*9219	410	1	-323369E+03	*9330
*9220	368	1	-337087E+01	*9220	411	1	0.898562E+02	*9331
*9221	369	1	0.222733E+02	*9221	412	1	-795076E+01	*9332
*9222	370	1	0.254233E+03	*9222	413	1	-406666E+01	*9333
*9223	371	1	0.570111E+03	*9223	414	1	0.952642E+02	*9334
*9224	372	1	0.211878E+04	*9224	415	1	0.256148E+03	*9335
*9225	373	1	0.303574E+03	*9225	416	1	0.903557E+03	*9336
*9226	375	1	-236553E+02	*9226	417	1	0.597779E+03	*9337
*9227	376	1	0.872011E+02	*9227	418	1	0.124134E+03	*9338
*9228	377	1	-226099E+03	*9228	419	1	-470681E+01	*9339
*9229	378	1	0.236420E+04	*9229	420	1	-373270E+00	*9340
*9230	379	1	-100636E+05	*9230	421	1	-139221E+04	*9341
*9231	380	1	0.832375E+05	*9231	422	1	-419824E+03	*9342
DMIG	*VTAIL	381	1		423	1	-351213E+05	*9343
*9232	357	1	-215496E-02	*9232	424	1	-580778E+03	*9344
*9233	358	1	-127980E+00	*9233	425	1	0.515640E+02	*9345
*9234	359	1	-670087E+00	*9234	426	1	0.268160E+01	*9346
*9235	360	1	-448327E+01	*9235	427	1	-203257E+01	*9347
*9236	361	1	-502647E+02	*9236	428	1	-981071E-01	*9348
*9237	362	1	0.467089E+02	*9237	429	1	-714582E-02	*9349
*9238	363	1	0.163977E+04	*9238	430	1	-269212E+04	*9350
*9239	364	1	-479445E+04	*9239	431	1	0.349451E+05	*9351
*9240	367	1	-110671E+00	*9240	432	1	0.106815E+00	*9352
*9241	368	1	0.669332E+00	*9241	433	1	-224760E+02	*9353
*9242	369	1	-571058E+01	*9242	434	1	0.196095E+03	*9354
*9243	370	1	-182164E+02	*9243	435	1	-359483E+03	*9355
*9244	371	1	-460481E+02	*9244	436	1	0.606719E+04	*9356
*9245	372	1	0.878765E+02	*9245	437	1	0.281741E+03	*9357
*9246	373	1	0.449404E+03	*9246	438	1	0.117268E+03	*9358
*9247	375	1	0.842499E+01	*9247	439	1	0.195964E+02	*9359
*9248	376	1	-320128E+02	*9248	440	1	-452626E+00	*9360
*9249	377	1	0.773381E+02	*9249	441	1		*9361
*9250	378	1	-617478E+03	*9250	442	1		
*9251	379	1	0.379035E+04	*9251	443	1		

*9361	368	1	0.496996E+02
*9362	369	1	0.352965E+03
*9363	370	1	-.142282E+03
*9364	371	1	0.322191E+03
*9365	372	1	0.854219E+02
*9366	373	1	0.160192E+02
*9367	375	1	0.323717E+03
*9368	376	1	-.318383E+02
*9369	377	1	-.420586E+03
*9370	378	1	-.314870E+05
*9371	379	1	-.689858E+03
*9372	380	1	0.423422E+01
*9373	381	1	0.102897E+02
*9374	382	1	0.527408E+00
*9375	383	1	0.337155E-01
*9376	384	1	0.643374E+03
*9377	385	1	-.357044E+04
*9378	386	1	0.322247E+05
DMIG *VTAIL	387	1	
*9379	357	1	-.338835E+00
*9380	358	1	-.546516E-01
*9381	359	1	0.188194E+00
*9382	360	1	0.399533E-01
*9383	361	1	0.777587E-02
*9384	362	1	-.905881E-03
*9385	363	1	0.475235E-04
*9386	364	1	0.368288E-04
*9387	367	1	-.149039E-01
*9388	368	1	0.885053E-01
*9389	369	1	0.672132E-01
*9390	370	1	0.462911E-02
*9391	371	1	-.849053E-03
*9392	372	1	0.795566E-04
*9393	373	1	0.977434E-05
*9394	375	1	-.960622E+02
*9395	376	1	0.984160E+00
*9396	377	1	0.481161E-01
*9397	378	1	-.891686E-03
*9398	379	1	-.753510E-03
*9399	380	1	-.204675E-04
*9400	381	1	0.508574E-05
*9401	382	1	-.608804E-07
*9402	383	1	0.551832E-07
*9403	384	1	-.178513E+03
*9404	385	1	0.105938E+04
*9405	386	1	-.419783E+04
*9406	387	1	0.497765E+04
DMIG *VTAIL	388	1	
*9407	357	1	0.396140E-01
*9408	358	1	-.883404E-01
*9409	359	1	0.845446E+00
*9410	360	1	-.468879E+01
*9411	361	1	0.502871E+02
*9412	362	1	0.250159E+03
*9413	363	1	0.874634E+04
*9414	364	1	0.134833E+04
*9415	367	1	0.310222E-01
*9416	368	1	-.236734E+00
*9417	369	1	0.235626E+01
*9418	370	1	0.161871E+02
*9419	371	1	0.211136E+02
*9420	372	1	-.961292E+03
*9421	373	1	0.278446E+03
*9422	375	1	0.102905E+02
*9423	376	1	-.286084E+01
*9424	377	1	0.459790E+01
*9425	378	1	-.225652E+02
*9426	379	1	-.362756E+03
*9427	380	1	-.513037E+05
*9428	381	1	-.124016E+04
*9429	382	1	-.303660E+04
*9430	383	1	-.859051E+03
*9431	384	1	0.185899E+02
*9432	385	1	-.106061E+03
*9433	386	1	0.590076E+03
*9434	387	1	-.160275E+04
*9435	388	1	0.483130E+05
DMIG *VTAIL	389	1	
*9436	357	1	0.103213E+02
*9437	358	1	0.166475E+01
*9438	359	1	-.573260E+01
*9439	360	1	-.121702E+01
*9440	361	1	-.236861E+00
*9441	362	1	0.275941E-01
*9442	363	1	-.144762E-02
*9443	364	1	-.112184E-02
*9444	367	1	0.453988E+00
*9445	368	1	-.269597E+01
*9446	369	1	-.204739E+01
*9447	370	1	-.141008E+00
*9448	371	1	0.258631E-01
*9449	372	1	-.242338E-02
*9450	373	1	-.297737E-03
*9451	375	1	0.292616E+04
*9452	376	1	-.299786E+02
*9453	377	1	-.146567E+01
*9454	378	1	0.271617E-01
*9455	379	1	0.229527E-01
*9456	380	1	0.623463E-03
*9457	381	1	-.154917E-03
*9458	382	1	0.185448E-05
*9459	383	1	-.168094E-05
*9460	384	1	-.237751E+04
*9461	385	1	0.187243E+04
*9462	386	1	0.147890E+03
*9463	387	1	-.464456E+02
*9464	388	1	0.463955E+01
*9465	389	1	0.507054E+04
DMIG *VTAIL	390	1	
*9466	384	1	0.243194E+04
*9467	385	1	-.408017E+04
*9468	386	1	0.137165E+04
*9469	389	1	-.414326E+04
*9470	390	1	0.591447E+04

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DMIG *VTAIL	391	1	
*9471	385	1	0.137165E+04
*9472	386	1	-.273356E+04
*9473	387	1	0.123460E+04
*9474	389	1	0.729919E+02
*9475	390	1	-.160803E+04
*9476	391	1	0.320895E+04
DMIG *VTAIL	392	1	
*9477	386	1	0.123460E+04
*9478	387	1	-.183606E+04
*9479	388	1	0.532735E+03
*9480	389	1	-.270690E+02
*9481	390	1	0.120338E+03
*9482	391	1	-.161773E+04
*9483	392	1	0.207529E+04
DMIG *VTAIL	393	1	
*9484	387	1	0.571031E+03
*9485	388	1	-.673689E+03
*9486	389	1	0.223540E+01
*9487	390	1	-.993771E+01
*9488	391	1	0.711305E+02
*9489	392	1	-.482110E+03
*9490	393	1	0.521340E+03
DMIG *VTAIL	406	1	
*9491	357	1	-.173625E+05
*9492	358	1	-.280045E+04
*9493	359	1	0.964342E+04
*9494	360	1	0.204728E+04
*9495	361	1	0.398450E+03
*9496	362	1	-.464190E+02
*9497	363	1	0.243519E+01
*9498	364	1	0.188718E+01
*9499	367	1	-.763702E+03
*9500	368	1	0.453518E+04
*9501	369	1	0.344413E+04
*9502	370	1	0.237204E+03
*9503	371	1	-.435070E+02
*9504	372	1	0.407663E+01
*9505	373	1	0.500855E+00
*9506	375	1	-.443406E+06
*9507	376	1	0.504302E+05
*9508	377	1	0.246556E+04
*9509	378	1	-.456917E+02
*9510	379	1	-.386113E+02
*9511	380	1	-.104880E+01
*9512	381	1	0.260603E+00
*9513	382	1	-.311963E-02
*9514	383	1	0.282769E-02
*9515	384	1	-.968350E+06
*9516	385	1	0.197004E+04
*9517	386	1	-.358031E+03
*9518	387	1	0.100278E+03
*9519	388	1	-.101088E+02
*9520	389	1	-.305457E+04
*9521	406	1	0.176490E+07
DMIG *VTAIL	407	1	
*9522	357	1	-.911903E+05
*9523	358	1	0.728130E+04
*9524	359	1	0.231467E+03
*9525	360	1	-.841305E+02
*9526	361	1	0.529257E+01
*9527	362	1	-.984070E+00
*9528	363	1	0.155806E+00
*9529	364	1	0.153670E-01
*9530	367	1	-.501667E+05
*9531	368	1	0.663999E+03
*9532	369	1	-.918211E+02
*9533	370	1	-.938795E+00
*9534	371	1	0.891667E+00
*9535	372	1	-.955200E+00
*9536	373	1	0.604210E-01
*9537	375	1	-.290253E+04
*9538	376	1	0.464443E+03
*9539	377	1	0.589231E+02
*9540	378	1	0.925670E+00
*9541	379	1	0.568770E+00
*9542	380	1	-.965196E-01
*9543	381	1	0.253072E-01
*9544	382	1	0.225246E-03
*9545	383	1	0.233053E-03
*9546	384	1	0.675815E+04
*9547	385	1	-.939438E+00
*9548	386	1	0.715953E+00
*9549	387	1	-.379983E-01
*9550	388	1	0.102725E-01
*9551	389	1	0.115747E+01
*9552	406	1	-.194711E+04
*9553	407	5	0.676867E+06
*9554	407	5	0.122983E+06
DMIG *VTAIL	407	5	
*9522	357	1	0.191080E+06
*9523	358	1	-.356714E+05
*9524	359	1	-.280960E+05
*9525	360	1	-.160270E+04
*9526	361	1	-.918511E+02
*9527	362	1	-.156290E+02
*9528	363	1	0.105740E+02
*9529	364	1	-.110634E+01
*9530	367	1	-.804513E+06
*9531	368	1	-.532051E+05

*9546	384	1	0.106276E+05	*9547	*9654	408	1	-1.10606E+05	*9655
*9547	385	1	-.226352E+02	*9548	*9655	409	5	0.437083E+07	
*9548	386	1	0.519700E+02	*9549	EIGR	1	MGIV	0.	
*9549	387	1	0.257476E+00	*9550	*EIG1	MAX		60.	*EIG1
*9550	388	1	0.673053E+00	*9551	GRID	1	5	-136.4059.331 .000	0
*9551	389	1	-.784298E+01	*9552	GRID	2	5	-131.7509.602 .000	0
*9552	406	1	0.131935E+05	*9553	GRID	3	5	-100.75011.331 .000	0
*9553	407	5	0.195301E+08		GRID	4	5	-75.750 12.725 .000	0
DMIG	*VTAIL	408	1	*9587	GRID	5	5	-40.750 14.678 .000	0
*9587	357	1	0.744264E+03	*9588	GRID	6	5	0.000 17.047 .000	0
*9588	358	1	0.120044E+03	*9589	GRID	7	5	24.947 18.341 .000	0
*9589	359	1	-.413376E+03	*9590	GRID	8	5	-141.0943.076 .000	0
*9590	360	1	-.877589E+02	*9591	GRID	9	0	-170.615-371.062.000	5
*9591	361	1	-.170800E+02	*9592	GRID	10	5	-100.7503.353 .000	0
*9592	362	1	0.198980E+01	*9593	GRID	11	0	-145.429-352.988.000	5
*9593	363	1	-.104387E+00	*9594	GRID	12	5	-75.750 3.524 .000	0
*9594	364	1	-.808958E-01	*9595	GRID	13	0	-125.118-338.412.000	5
*9595	368	1	0.327369E+02	*9596	GRID	14	5	-40.750 3.763 .000	0
*9597	369	1	-.194405E+03	*9597	GRID	15	0	-96.682 -318.006.000	5
*9598	370	1	-.147636E+03	*9598	GRID	16	5	0.000 4.054 .000	0
*9599	371	1	-.101680E+02	*9599	GRID	17	0	-63.574 -294.247.000	5
*9600	372	1	0.186498E+01	*9600	GRID	18	5	14.758 4.143 .000	0
*9601	373	1	-.174749E+00	*9601	GRID	19	0	-180.000-381.378.000	0
*9602	375	1	-.214697E-01	*9602	GRID	20	0	-168.385-374.169.000	0
*9603	376	1	0.211004E+06	*9603	GRID	21	0	-157.000-366.154.000	0
*9604	377	1	-.216175E+04	*9604	GRID	22	0	-147.640-359.565.000	0
*9605	378	1	-.105689E+03	*9605	GRID	23	0	-143.035-356.324.000	1
*9606	379	1	0.195862E+01	*9606	GRID	24	0	-139.738-354.003.000	0
*9607	380	1	0.165511E+01	*9607	GRID	25	0	-122.591-341.932.000	1
*9608	381	1	0.449577E-01	*9608	GRID	26	0	-120.000-340.108.000	0
*9609	382	1	-.111710E-01	*9609	GRID	27	0	-93.970 -321.785.000	1
*9610	383	1	0.133726E-03	*9610	GRID	29	0	-86.000 -316.174.000	0
*9611	384	1	-.121212E-03	*9611	GRID	30	0	-60.647 -298.327.000	1
*9612	385	1	0.418267E+05	*9612	GRID	31	0	-41.500 -293.800.000	0
*9613	386	1	0.214221E+03	*9613	GRID	32	0	-54.216 -293.800.000	0
*9614	387	1	-.445492E+02	*9614	GRID	33	0	-41.500 -293.800.000	0
*9615	388	1	0.145153E+02	*9615	GRID	34	0	-25.500 -293.800.000	0
*9616	389	1	-.144600E+01	*9616	GRID	35	0	-25.500 -293.800.000	0
*9617	406	1	-.442150E+03	*9617	GRID	36	0	.000 -293.80 .000	0
*9618	407	5	-.361694E+06	*9618	GRID	37	0	-41.500 -308.500.000	0
*9619	407	5	-.565555E+03	*9619	GRID	38	0	-54.216 -310.784.000	0
*9620	408	1	0.834648E+02	*9620	GRID	39	0	-41.500 -308.500.000	0
DMIG	*VTAIL	409	1		GRID	40	0	-25.500 -308.500.000	0
*9656	357	1	0.109547E+06	*9656	GRID	41	0	-25.500 -308.500.000	0
*9657	358	1	-.262206E+05	*9657	GRID	42	0	.000 -308.50 .000	0
*9658	359	1	-.103588E+04	*9658	GRID	44	0	-86.000 -332.494.000	0
*9659	360	1	0.214164E+04	*9659	GRID	45	0	-41.500 -324.500.000	0
*9660	361	1	0.293531E+03	*9660	GRID	46	0	-54.216 -326.784.000	0
*9661	362	1	0.269486E+02	*9661	GRID	47	0	-41.500 -324.500.000	0
*9662	363	1	-.242846E+01	*9662	GRID	48	0	-25.500 -324.500.000	0
*9663	364	1	0.525678E-01	*9663	GRID	49	0	-25.500 -324.500.000	0
*9664	367	1	0.172746E+00	*9664	GRID	50	0	.000 -324.50 .000	0
*9665	368	1	0.323348E+04	*9665	GRID	51	0	-139.738-358.146.000	0
*9666	369	1	0.215706E+04	*9666	GRID	52	0	-120.000-354.601.000	0
*9667	370	1	0.503979E+03	*9667	GRID	53	0	-86.000 -348.494.000	0
*9668	371	1	0.246870E+02	*9668	GRID	54	0	-41.500 -340.500.000	0
*9669	372	1	-.255333E+01	*9669	GRID	55	0	-54.216 -342.784.000	0
*9670	373	1	0.824261E+00	*9670	GRID	56	0	-41.500 -340.500.000	0
*9671	375	1	0.127325E-01	*9671	GRID	57	0	-25.500 -340.500.000	0
*9672	376	1	-.458756E+05	*9672	GRID	58	0	-25.500 -340.500.000	0
*9673	377	1	0.207304E+03	*9673	GRID	59	0	.000 -340.50 .000	0
*9674	378	1	0.280582E+02	*9674	GRID	60	0	-168.385-379.292.000	0
*9675	379	1	-.203789E+02	*9675	GRID	61	0	-157.000-377.247.000	0
*9676	380	1	-.339806E+01	*9676	GRID	62	0	-139.738-374.146.000	0
*9677	381	1	-.120555E+00	*9677	GRID	63	0	-131.000-372.576.000	0
*9678	382	1	0.420144E-01	*9678	GRID	64	0	-120.000-370.601.000	0
*9679	383	1	0.823926E-04	*9679	GRID	65	0	-86.000 -364.494.000	0
*9680	384	1	0.414972E-03	*9680	GRID	66	0	-41.500 -356.500.000	0
*9681	385	1	0.520328E+05	*9681	GRID	67	0	-54.216 -358.784.000	0
*9682	386	1	0.124228E+01	*9682	GRID	68	0	-41.500 -356.500.000	0
*9683	387	1	-.178476E+01	*9683	GRID	69	0	-25.500 -356.500.000	0
*9684	388	1	-.785608E+00	*9684	GRID	70	0	-25.500 -356.500.000	0
*9685	389	1	0.666356E-01	*9685	GRID	71	0	.000 -356.50 .000	0
*9686	406	1	0.239304E+02	*9686	GRID	72	0	-180.000-398.678.000	0
*9687	407	5	-.402560E+05	*9687	GRID	73	0	-168.385-396.592.000	0
*9688	407	5	0.438355E+05	*9688	GRID	74	0	-157.000-394.547.000	0
*9689	408	1	0.785184E+04	*9689	GRID	75	0	-139.738-391.446.000	0
*9690	409	5	0.172562E+04	*9690	GRID	76	0	-131.000-389.876.000	7
*9691	409	1	0.179613E+06	*9691	GRID	77	0	-120.000-387.901.000	0
DMIG	*VTAIL	409	5		GRID	78	0	-86.000 -381.794.000	0
*9621	357	1	0.431661E+05	*9621	GRID	79	0	-29.250 -417.400.000	0
*9622	358	1	-.108056E+06	*9622	GRID	80	0	-54.216 -376.084.000	0
*9623	359	1	-.369272E+04	*9623	GRID	81	0	-41.500 -373.800.000	7
*9624	360	1	-.168866E+05	*9624	GRID	82	0	-25.500 -373.800.000	0
*9625	361	1	-.236393E+04	*9625	GRID	83	0	-25.500 -373.800.000	0
*9626	362	1	-.229630E+03	*9626	GRID	84	0	.000 -373.80 .000	0
*9627	363	1	0.221145E+02	*9627	GRID	85	0	-180.000-406.675.000	0
*9628	364	1	-.744120E+00	*9628	GRID	86	0	-168.385-406.191.000	0
*9629	367	1	-.145670E+01	*9629	GRID	87	0	-157.000-405.717.000	0
*9630	368	1	-.615575E+04	*9630	GRID	88	0	-139.738-404.997.000	0
*9631	369	1	-.153980E+05	*9631	GRID	89	0	-139.738-393.695.000	0
*9632	370	1	-.392419E+04	*9632	GRID	90	0	-130.626-392.267.000	0
*9633	371	1	-.182427E+03	*9633	GRID	91	0	-111.224-389.227.000	0
*9634	372	1	0.179957E+02	*9634	GRID	92	0	-85.970 -385.270.000	0
*9635	373	1	-.376324E+01	*9635	GRID	93	0	-53.000 -380.104.000	0
*9636	375	1	-.241942E+00	*9636	GRID	94	0	-29.250 -373.800.000	0
*9637	376	1	-.145521E+06	*9637	GRID	95	0	-41.500 -378.302.000	0
*9638	377	1	-.194645E+04	*9638	GRID	96	0	-139.738-397.461.000	0
*9639	378	1	-.813680E+03	*9639	GRID	97	0	-129.992-396.307.000	0
*9640	379	1	0.145115E+03	*9640	GRID	98	0	-110.476-393.998.000	0
*9641	380	1	0.267615E+02	*9641	GRID	99	0	-85.073 -390.992.000	0
*9642	381	1	0.128482E+01	*9642	GRID	100	0	-53.000 -387.196.000	0
*9643	382	1	-.454159E+00	*9643	GRID	101	0	-41.500 -385.835.000	0
*9644	383	1	-.347133E-02	*9644	GRID	102	0	-139.738-401.269.000	0
*9645	384	1	-.417601E-02	*9645	GRID	103	0	-129.345-400.438.000	0
*9646	385	1	-.184205E+06	*9646	GRID	104	0	-109.713-398.867.000	0
*9647	386	1	-.595504E+02	*9647	GRID	105	0	-84.160 -396.823.000	0
*9648	387	1	0.172236E+02	*9648	GRID	106	0	-53.000 -394.330.000	0
*9649	388	1	0.503546E+01	*9649	GRID	107	0	-41.500 -393.410.000	0
*9650	389	1	-.432889E+00	*9650	GRID	108	0	-139.738-404.997.000	0
*9651	406	1	-.153385E+03	*9651	GRID	109	0	-128.703-404.537.000	0
*9652	407	5	0.258026E+06	*9652	GRID	110	0	-108.954-403.714.000	0
*9653	407	5	0.882856E+05	*9653	GRID	111	0	-83.248 -402.642.000	0
*9654	407	1	0.627816E+05	*9654	GRID	112	0	-53.000 -401.381.000	0

GRID	113	0	-41.500	-400.902.000	0
GRID	114	0	-41.500	-417.400.000	0
GRID	115	0	-25.500	-417.400.000	0
GRID	116	0	-25.500	-417.400.000	0
GRID	117	0	.000	-417.40 .000	0
GRID	118	0	-39.431	-373.800.000	0
GRID	119	0	-38.792	-377.878.000	0
GRID	120	0	-32.600	-417.400.000	0
GRID	121	0	-41.500	-373.800.000	0
GRID	122	0	-120.926	-390.747.000	0
GRID	123	0	-101.524	-387.707.000	0
GRID	124	0	-70.415	-382.833.000	0
GRID	125	0	-120.235	-395.153.000	0
GRID	126	0	-100.719	-392.843.000	0
GRID	127	0	-69.427	-389.140.000	0
GRID	128	0	-119.530	-399.653.000	0
GRID	129	0	-99.898	-398.082.000	0
GRID	130	0	-68.420	-395.564.000	0
GRID	131	0	-118.830	-404.125.000	0
GRID	132	0	-99.081	-403.302.000	0
GRID	133	0	-67.414	-401.982.000	0
GRID	134	0	-139.738	-394.695.000	7
GRID	135	0	-130.473	-393.243.000	7
GRID	136	0	-120.773	-391.723.000	7
GRID	137	0	-111.071	-390.203.000	7
GRID	138	0	-101.371	-388.683.000	7
GRID	139	0	-85.817	-386.246.000	7
GRID	140	0	-70.262	-383.809.000	7
GRID	141	0	-53.000	-381.104.000	7
GRID	142	0	-41.500	-379.302.000	7
GRID	143	0	-180.000	-389.378.000	0
GRID	144	0	.000	-100.00 .000	0
GRID	145	0	.000	-160.00 .000	0
GRID	146	0	.000	-200.00 .000	0
GRID	147	0	.000	-252.50 .000	0
GRID	148	0	.000	-60.00 .000	0
GRID	149	0	.000	-78.80 .000	0
GRID	150	5	-116.250	10.466 .000	0
GRID	151	5	-88.250	12.029 .000	0
GRID	152	5	-58.250	13.701 .000	0
GRID	153	5	-19.500	15.863 .000	0
GRID	154	5	-116.250	3.247 .000	0
GRID	155	5	-88.250	3.438 .000	0
GRID	156	5	-58.250	3.643 .000	0
GRID	157	5	-19.500	3.908 .000	0
GRID	158	0	-71.000	-305.615.000	0
GRID	159	0	-71.000	-313.799.000	0
GRID	160	0	-71.000	-329.799.000	0
GRID	161	0	-71.000	-345.799.000	0
GRID	162	0	-71.000	-361.799.000	0
GRID	163	0	-71.000	-379.099.000	7
GRID	164	0	-102.000	-327.437.000	0
GRID	165	0	-102.000	-335.367.000	0
GRID	166	0	-102.000	-351.367.000	0
GRID	167	0	-102.000	-367.367.000	0
GRID	168	0	-102.000	-384.667.000	7
GRID	169	0	-131.000	-347.852.000	0
GRID	170	0	-131.000	-356.576.000	0
GRID	171	5	-131.750	3.141 .000	0
GRID	172	0	.000	-385.600.000	0
GRID	173	0	.000	-447.000.000	0
GRID	174	0	-41.500	-497.500.000	0
GRID	175	0	-31.810	-497.500.000	0
GRID	176	0	-168.385	-387.292.000	0
GRID	177	0	-157.000	-385.247.000	0
GRID	178	0	-139.738	-382.146.000	0
GRID	179	0	-131.000	-380.576.000	0
GRID	180	0	-41.500	-463.052.000	0
GRID	181	0	-67.903	-482.973.000	0
GRID	182	0	-81.403	-493.159.000	0
GRID	183	0	-92.653	-501.646.000	0
GRID	184	0	-103.085	-509.517.000	0
GRID	185	0	-110.127	-514.830.000	0
GRID	186	0	-57.952	-504.942.000	0
GRID	187	0	-72.299	-513.261.000	0
GRID	188	0	-84.253	-520.193.000	0
GRID	189	0	-95.338	-526.621.000	0
GRID	190	0	-110.127	-535.197.000	0
GRID	191	0	-41.500	-541.265.000	0
GRID	192	0	-59.060	-542.488.000	0
GRID	193	0	-73.693	-543.508.000	0
GRID	194	0	-87.261	-544.453.000	0
GRID	195	0	-102.862	-545.540.000	0
GRID	196	0	.000	-153.25 .000	0
GRID	197	0	.000	-276.42 .000	0
GRID	198	0	-36.000	-469.194.000	0
GRID	199	0	-36.000	-497.500.000	0
GRID	200	0	-29.250	-497.500.000	0
GRID	201	0	-40.750	-497.500.000	0
GRID	202	0	-40.750	-479.550.000	0
GRID	203	0	-29.250	-479.550.000	0
GRID	204	0	-29.250	-479.550.000	0
GRID	205	0	-40.750	-469.194.000	0
GRID	206	0	-29.250	-469.194.000	0
GRID	207	0	-40.750	-462.820.000	0
GRID	208	0	.000	-479.55 .000	0
GRID	209	0	.000	-462.82 .000	0
GRID	210	0	.000	-446.10 .000	0
GRID	211	0	.000	-447.00 .000	0
GRID	212	0	.000	-424.00 .000	0
GRID	213	0	.000	-403.00 .000	0
GRID	214	0	-29.250	-462.820.000	0
GRID	215	0	-29.250	-462.820.000	0
GRID	216	0	-40.750	-446.100.000	0
GRID	217	0	-29.250	-446.100.000	0
GRID	218	0	-29.250	-446.100.000	0
GRID	219	0	-19.000	-446.100.000	0
GRID	220	0	.000	-426.400.000	0
GRID	221	0	.000	-385.60 .000	0
GRID	222	0	-33.570	-497.500.000	0
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GRID	226	0	.000	-484.34962.317	0

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GRID	365	0	.000	-446.10044.849	0	
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GRID	372	0	.000	-492.59445.000	0	
GRID	373	0	.000	-498.20753.064	0	
GRID	374	0	.000	-512.83174.074	0	
GRID	375	0	.000	-527.44695.070	0	
GRID	376	0	.000	-535.762107.018	0	
GRID	377	0	.000	-545.147120.500	0	
GRID	378	0	.000	-548.279125.000	0	
GRID	379	0	.000	-560.736120.500	0	
GRID	380	0	.000	-563.088125.000	0	
GRID	381	0	.000	-498.05345.000	0	
GRID	382	0	.000	-516.03771.933	0	
GRID	383	0	.000	-530.24093.204	0	
GRID	384	0	.000	-538.321105.309	0	
GRID	385	0	.000	-548.465120.500	0	
GRID	386	0	.000	-521.28945.000	0	
GRID	387	0	.000	-530.36462.367	0	
GRID	388	0	.000	-542.27685.168	0	
GRID	389	0	.000	-549.05598.142	0	
GRID	390	0	.000	-560.736120.500	0	
GRID	391	0	.000	-500.00 .000	0	
GRID	392	0	.000	-498.24941.224	0	
GRID	393	0	.000	-446.10025.500	0	
GRID	394	0	.000	-509.89233.450	0	
GRID	395	0	.000	-479.02125.500	0	
GRID	396	0	.000	-426.40 .000	0	
GRID	397	0	.000	-351.70 .000	0	
GRID	398	0	.000	-325.40 .000	0	
GRID	399	0	.000	-266.92 .000	0	
GRID	400	0	.000	-274.55 .000	0	
GRID	401	0	.000	-29.250	-492.500.000	0
GRID	402	0	.000	-40.750	-492.500.000	0
GRID	403	0	.000	-29.250	-502.250.000	0
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GRID	429	0	.000	-80.477	-544.0080.	0
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GRID	433	3	0.	0.	-100.	0
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GRID	437	5	-75.750	12.725 .700	0	0
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GRID	442	5	-100.7503.353	1.150	0	0
GRID	443	5	-75.750	3.524 1.410	0	0
GRID	444	5	-40.750	3.763 1.765	0	0
GRID	445	5	0.000	4.054 2.190	0	0
GRID	446	5	14.758	4.143 2.080	0	0
GRID	447	0	-180.000	-381.378.790	0	0
GRID	448	0	-168.385	-374.169.965	1	0
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GRID	451	0	-143.035	-356.3241.358	1	0
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GRID	1061	0	-157.000	-377.2471.108	0
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GRID	1081	0	-41.500	-373.8001.364	7
GRID	1082	0	-25.500	-373.80011.100	0
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GRID	1087	0	-157.000	-405.717.115	0
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GRID	1131	0	-118.830	-404.125.182	0
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GRID	1134	0	-139.738	-394.695.531	7
GRID	1135	0	-130.473	-393.243.585	7
GRID	1136	0	-120.773	-391.723.641	7
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GRID	1138	0	-101.371	-388.683.754	7
GRID	1139	0	-85.817	-386.246.844	7
GRID	1140	0	-70.262	-383.809.934	7
GRID	1141	0	-53.000	-381.1041.050	7
GRID	1142	0	-41.500	-379.3023.412	7
GRID	1143	0	-180.000	-389.378.675	0
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GRID	1176	5	-19.500	15.863 1.015	0
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GRID	1191	0	-102.000	-384.667.924	7
GRID	1192	0	-131.000	-347.8521.517	0
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GRID	1512	0	-49.726	-501.2212.646	0	
GRID	1513	0	-65.126	-509.1022.152	0	
GRID	1514	0	-78.276	-516.7271.619	0	
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GRID	2003	5	-100.75011.331	-.560	0	
GRID	2004	5	-75.750	12.725	-.700	0
GRID	2005	5	-40.750	14.678	-.895	0
GRID	2006	5	0.000	17.047	-1.115	0
GRID	2007	5	24.947	18.341	-1.245	0
GRID	2008	5	-141.0943.076	-.845	0	
GRID	2010	5	-100.7503.353	-1.150	0	
GRID	2012	5	-75.750	3.524	-1.410	0
GRID	2014	5	-40.750	3.763	-1.765	0
GRID	2016	5	0.000	4.054	-2.190	0
GRID	2018	5	14.758	4.143	-2.080	0
GRID	2019	0	-180.000	-381.378	-.790	0
GRID	2020	0	-168.385	-374.169	-.965	1
GRID	2021	0	-157.000	-366.154	-1.156	0
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GRID	2023	0	-143.035	-356.324	-1.358	1
GRID	2024	0	-139.738	-354.003	-1.400	0
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GRID	2026	0	-120.000	-340.108	-1.663	0
GRID	2027	0	-93.970	-321.785	-2.018	1
GRID	2029	0	-86.000	-316.174	-2.124	0
GRID	2030	0	-60.647	-298.327	-2.534	1
GRID	2031	0	-41.500	-293.800	-4.750	0
GRID	2032	0	-54.216	-293.800	-2.600	0
GRID	2033	0	-41.500	-293.800	-3.209	8
GRID	2034	0	-25.500	-293.800	-9.850	0
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GRID	2039	0	-41.500	-308.500	-3.166	0
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GRID	2047	0	-41.500	-324.500	-2.944	0
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GRID	2051	0	-139.738	-358.146	-1.446	0
GRID	2052	0	-120.000	-354.601	-1.763	0
GRID	2053	0	-86.000	-348.494	-2.112	0
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GRID	2056	0	-41.500	-340.500	-2.598	0
GRID	2057	0	-25.500	-340.500	-10.750	0
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GRID	2066	0	-41.500	-356.500	-5.800	0
GRID	2067	0	-54.216	-358.784	-1.908	0
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GRID	2069	0	-25.500	-356.500</		

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GRID	2127	0	-69.427	-389.140	-737	0
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GRID	2135	0	-130.473	-393.243	-585	7
GRID	2136	0	-120.773	-391.723	-641	7
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GRID	2138	0	-101.371	-388.683	-754	7
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GRID	2140	0	-70.262	-383.809	-934	7
GRID	2141	0	-53.000	-381.104	-1.050	7
GRID	2142	0	-41.500	-379.302	-3.412	7
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GRID	2179	5	-58.250	3.643	-1.590	0
GRID	2180	5	-19.500	3.908	-1.980	0
GRID	2181	0	-71.000	-305.615	-2.359	0
GRID	2182	0	-71.000	-313.799	-2.486	0
GRID	2183	0	-71.000	-329.799	-2.524	0
GRID	2184	0	-71.000	-345.799	-2.242	0
GRID	2185	0	-71.000	-361.799	-1.776	0
GRID	2186	0	-71.000	-379.099	-1.138	7
GRID	2187	0	-102.000	-327.437	-1.904	0
GRID	2188	0	-102.000	-335.367	-2.032	0
GRID	2189	0	-102.000	-351.367	-1.954	0
GRID	2190	0	-102.000	-367.367	-1.559	0
GRID	2191	0	-102.000	-384.667	-924	7
GRID	2192	0	-131.000	-347.952	-1.517	0
GRID	2193	0	-131.000	-356.576	-1.617	0
GRID	2194	5	-131.750	3.141	-875	0
GRID	2233	0	-41.500	-497.500	-2.790	0
GRID	2242	0	-168.385	-387.292	-764	0
GRID	2243	0	-157.000	-385.247	-862	0
GRID	2244	0	-139.738	-382.146	-1.004	0
GRID	2245	0	-131.000	-380.576	-1.080	0
GRID	2251	0	-41.500	-463.052	-1.021	0
GRID	2252	0	-67.903	-482.973	-716	0
GRID	2253	0	-81.403	-493.159	-560	0
GRID	2254	0	-92.653	-501.646	-430	0
GRID	2255	0	-103.085	-509.517	-309	0
GRID	2256	0	-110.127	-514.830	-228	0
GRID	2257	0	-57.952	-504.942	-2.503	0
GRID	2258	0	-72.299	-513.261	-1.801	0
GRID	2259	0	-84.253	-520.193	-1.437	0
GRID	2260	0	-95.338	-526.621	-1.091	0
GRID	2261	0	-110.127	-535.197	-606	0
GRID	2262	0	-41.500	-541.265	-833	0
GRID	2263	0	-59.060	-542.488	-670	0
GRID	2264	0	-73.693	-543.508	-531	0
GRID	2265	0	-87.261	-544.453	-399	0
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GRID	2275	0	-40.750	-479.550	-5.000	0
GRID	2276	0	-29.250	-479.550	-6.150	0
GRID	2280	0	-40.750	-462.820	-5.500	0
GRID	2290	0	-29.250	-462.820	-7.000	0
GRID	2292	0	-40.750	-446.100	-5.650	0
GRID	2293	0	-29.250	-446.100	-7.000	0
GRID	2464	0	-29.250	-492.500	-4.500	0
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GRID	2501	0	-54.702	-473.013	-0.868	0
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GRID	2509	0	-88.453	-510.920	-0.934	0
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GRID	2512	0	-49.726	-501.221	-2.646	0
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GRID	2515	0	-89.796	-523.407	-1.264	0
GRID	2516	0	-102.733	-530.909	-0.848	0
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GRID	2518	0	-49.726	-523.104	-1.668	0
GRID	2519	0	-65.680	-527.875	-1.236	0
GRID	2520	0	-78.973	-531.805	-0.984	0
GRID	2521	0	-91.3	-535.537	-0.745	0
GRID	2522	0	-106.495	-540.368	-0.427	0
GRID	2523	0	-50.28	-541.876	-0.752	0
GRID	2524	0	-66.376	-542.998	-0.600	0
GRID	2525	0	-80.477	-544.008	-0.465	0
GRID	2526	0	-95.062	-544.996	-0.324	0
GRID	3016	0	-180.0	-391.3910		0
GRID	3017	0	-182.88	-319.4		0
GRID	3018	0	-182.88	-346.1950		0
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GRID	3020	0	-182.88	-381.3780		0
GRID	3021	0	-182.88	-391.3910		0

GRID	3022	0	-182.88	-400.6450		0
GRID	3500	0	-120.	-335.09	-25.	
GRID	3501	0	-120.	-346.07	-11.20	
MAT1	1		10.5E6	5.53E6		
MAT1	2		10.5E6	4.0E6		
MAT1	3		9.9999E8	9.9999E8		
MAT1	4		10.5E6	9.9999E8		
MAT1	5		10.5E6	4.400E6		
MAT1	601		3.150E6	4.400E6		
MAT1	606		6.825E6	4.400E6		
MAT2	701		8681000.	2159000.	-78300.	7164000.-78300. 2558000.
MAT2	702		7047000.	2537000.	-160600.	8488000.-160600.2700000.
MAT2	703		6618000.	2464000.	-254500.	8980000.-254500.2625000.
MAT2	704		6501000.	2411000.	-94900.	9416000.-94900. 2500000.
MAT2	705		6047000.	2622000.	-109000.	9502000.-109000.2783000.
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MAT2	707		7849000.	2569000.	-130000.	7902000.-130000.2600000.
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PARAM	GRDPNT	0				
PARAM	WTMASS	0.00258				
PBAR	27	2	100.	9999.	9999.	9999.
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PBAR	2402	2	100.0	100.0	.00001	.001
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PBAR	2412	2	100.0	100.0	.00001	.001
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PBAR	2413	2	100.0	100.0	.00001	.001
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PBAR	2414	2	100.0	100.0	.00001	.001
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PBAR	2415	2	100.0	100.0	.00001	.001
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PBAR	2416	2	100.0	100.0	.00001	.001
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PBAR	2417	2	100.0	100.0	.00001	.001
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PBAR	2419	2	100.0	100.0	.00001	.001
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PBAR	2422	2	100.0			

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PBAR	2447	2	100.0	100.0	.000001	.001			
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PBAR	2448	2	100.0	100.0	.000001	.001			
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PBAR	2450	2	100.0	100.0	.000001	.001			
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PBAR	3502	2	10000.	99990.	99990.	99990.			
PBEAM	1	2	.690	480.000	371.450	.001			
+1	NO	1.0		593.000	547.400				
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PBEAM	2	2	.690	593.000	547.400	.001			
+2	NO	1.0		736.000	606.050				
+2A	0.	1.							
PBEAM	3	2	4.140	896.000	655.500	640.			
+3	NO	1.0		912.000	656.500				
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PBEAM	4	2	4.140	912.000	656.500	2175.			
+4	NO	1.0		3104.000	1780.000				
+4A	0.	1.							
PBEAM	5	2	4.140	3104.000	1780.000	2770.			
+5	NO	1.0		6240.000	3625.000				
+5A	0.	1.							
PBEAM	6	2	3.600	8000.000	245.000	5250.			
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PBEAM	7	2	1980.000	7900.000	4430.000	5250.			
+7	NO	1.0		8100.000	4170.000				
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PBEAM	8	2	1980.000	8100.000	4170.000	5250.			
+8	NO	1.0		9400.000	3900.000				
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PBEAM	9	2	1980.000	9400.000	3900.000	5250.		+9
+9	NO	1.0		9400.000	3887.062			+9A
+9A	0.	1.						
PBEAM	10	2	1980.000	9400.000	3887.062	5250.		+10
+10	NO	1.0		10100.003	3670.000			+10A
+10A	0.	1.						
PBEAM	11	2	1980.000	10100.003	3670.000	5250.		+11
+11	NO	1.0		1000.000	3691.000			+11A
+11A	0.	1.						
PBEAM	12	2	1980.000	1000.000	3691.000	5250.		+12
+12	NO	1.0		9600.000	3700.000			+12A
+12A	0.	1.						
PBEAM	13	2	1980.000	9600.000	3700.000	5250.		+13
+13	NO	1.0		8750.000	3780.000			+13A
+13A	0.	1.						
PBEAM	14	2	1980.000	8750.000	3780.000	5250.		+14
+14	NO	1.0		8123.630	3590.000			+14A
+14A	0.	1.						
PBEAM	15	2	1980.000	8123.630	3590.000	5250.		+15
+15	NO	1.0		7200.000	3340.000			+15A
+15A	0.	1.						
PBEAM	16	2	1980.000	7200.000	3340.000	5067.5		+16
+16	NO	1.0		6425.000	1872.000			+16A
+16A	0.	1.						
PBEAM	17	2	1980.000	6425.000	1872.000	4910.0		+17
+17	NO	1.0		1980.000	6375.0	1791.00		+17A
+17A	0.	1.						
PBEAM	18	2	1980.000	1980.000	6375.0	4725.0		+18
+18	NO	1.0		1980.000	6200.0			

PBEAM	144	2	2.800	1.	61.49	.001	+144	+1007	NO	1.	0.5704	4.188	+1007A
+144	NO	1.0	3.080		76.54		+144A	+1007A	0.	1.	-9.23-2		
+144A	0.	1.		-.0952				PBEAM	1009	2	0.05068	1.	7.4
PBEAM	145	2	3.080	1.	76.54	.001	+145	+1009	NO	1.	0.05704		+1009A
+145	NO	1.0	3.080		76.54		+145A	+1009A	0.	1.		-118	
+145A	0.	1.		.0000				PBEAM	1010	2	0.68448	1.	11.387
PBEAM	146	2	.990	1.	44.68	.001	+146	+1010	NO	1.	0.65988		+1010A
+146	NO	1.0	1.017		47.44		+146A	+1010A	0.	1.	3.66-2		
+146A	0.	1.		-.0269				PBEAM	1011	2	0.65988	1.	3.834
PBEAM	147	2	1.017	1.	34.25	.001	+147	+1011	NO	1.	0.58224		+1011A
+147	NO	1.0	1.620		103.19		+147A	+1011A	0.	1.		.125	
+147A	0.	1.		-.4573				PBEAM	1012	2	0.4852	1.	2.985
PBEAM	148	2	1.500	1.	24.08	.001	+148	+1012	NO	1.	0.3817		+1012A
+148	NO	1.0	1.875		39.37		+148A	+1012A	0.	1.		.239	
+148A	0.	1.		-.2222				PBEAM	1013	2	0.3817	1.	4.113
PBEAM	149	2	1.875	1.	39.37	.001	+149	+1013	NO	1.	0.2527		+1013A
+149	NO	1.0	2.250		59.52		+149A	+1013A	0.	1.		.407	
+149A	0.	1.		-.1818				PBEAM	1014	2	1.1795	1.	32.608
PBEAM	150	2	1.125	1.	44.13	.001	+150	+1014	NO	1.	1.24325		+1014A
+150	NO	1.0	1.538		87.37		+150A	+1014A	0.	1.		-5.26-2	
+150A	0.	1.		-.3099				PBEAM	1015	2	1.24325	1.	35.291
PBEAM	151	2	1.538	1.	86.52	.001	+151	+1015	NO	1.	1.26225		+1015A
+151	NO	1.0	1.750		115.17		+151A	+1015A	0.	1.		-1.52-2	
+151A	0.	1.		-.1293				PBEAM	1016	2	1.0098	1.	36.787
PBEAM	152	2	1.750	1.	115.17	.001	+152	+1016	NO	1.	0.897		+1016A
+152	NO	1.0	1.750		115.17		+152A	+1016A	0.	1.		.118	
+152A	0.	1.		.0000				PBEAM	1017	2	0.897	1.	28.514
PBEAM	153	2	14.000	1.	129.80	.001	+153	+1017	NO	1.	0.7106		+1017A
+153	NO	1.0	14.000		129.80		+153A	+1017A	0.	1.		.232	
+153A	0.	1.		.0000				PBEAM	1018	2	0.88825	1.	17.378
PBEAM	154	2	14.000	1.	79.18	.001	+154	+1018	NO	1.	0.569		+1018A
+154	NO	1.0	18.000		130.90		+154A	+1018A	0.	1.		.438	
+154A	0.	1.		-.2500				PBEAM	1020	2	.174168	1.	2.924
PBEAM	160	2	30.000	.001	.001	.001	+160	+1020	NO	1.	.192741		+1020A
+160	NO	1.0	30.000		.001		+160A	+1020A	0.	1.		-1.101	
+160A	0.	1.		.0000				PBEAM	1022	2	.004037	1.	8.0
PBEAM	161	2	1980.0001.		9999.00	.001	+161	+1022	NO	1.	.004701		+1022A
+161	NO	1.0	2970.000		9999.00		+161A	+1022A	0.	1.		-.152	
+161A	0.	1.		.0000				PBEAM	1023	2	.192741	1.	3.774
PBEAM	162	2	2970.0001.		9999.00	.001	+162	+1023	NO	1.	.173225		+1023A
+162	NO	1.0	1782.000		47.10		+162A	+1023A	0.	1.		.107	
+162A	0.	1.		.0000				PBEAM	1024	2	.173225	1.	1.931
PBEAM	163	2	1.080	1.	121.33	.001	+163	+1024	NO	1.	.137473		+1024A
+163	NO	1.0	1.080		99.73		+163A	+1024A	0.	1.		.230	
+163A	0.	1.		.0000				PBEAM	1025	2	.137473	1.	.991
PBEAM	164	2	1980.0001.		9999.00	.001	+164	+1025	NO	1.	.085198		+1025A
+164	NO	1.0	2970.000		9999.00		+164A	+1025A	0.	1.		.470	
+164A	0.	1.		.0000				PBEAM	1026	2	0.53326	1.	4.915
PBEAM	165	2	2970.0001.		9999.00	.001	+165	+1026	NO	1.	0.56896		+1026A
+165	NO	1.0	1980.000		9999.00		+165A	+1026A	0.	1.		-6.48-2	
+165A	0.	1.		.0000				PBEAM	1027	2	0.97536	1.	4.995
PBEAM	166	2	.840	1.	181.16	.001	+166	+1027	NO	1.	.93792		+1027A
+166	NO	1.0	.678		115.24		+166A	+1027A	0.	1.		3.91-2	
+166A	0.	1.		.2134				PBEAM	1028	2	0.54712	1.	4.858
PBEAM	167	2	1980.0001.		9999.00	.001	+167	+1028	NO	1.	0.43652		+1028A
+167	NO	1.0	1980.000		9999.00		+167A	+1028A	0.	1.		.225	
+167A	0.	1.		.0000				PBEAM	1029	2	0.12472	1.	2.292
PBEAM	168	2	1.400	1.	239.03	.001	+168	+1029	NO	1.	0.07392		+1029A
+168	NO	1.0	1.100		139.10		+168A	+1029A	0.	1.		.511	
+168A	0.	1.		.2400				PBEAM	1031	2	.602006	1.	12.135
PBEAM	169	2	4.200	1.	20.00	.001	+169	+1031	NO	1.	.638206		+1031A
+169	NO	1.0	3.210		20.00		+169A	+1031A	0.	1.		-5.84-2	
+169A	0.	1.		.0000				PBEAM	1033	2	0.0327	1.	5.4
PBEAM	170	2	3.210	1.	20.00	.001	+170	+1033	NO	1.	0.03526		+1033A
+170	NO	1.0	3.300		20.00		+170A	+1033A	0.	1.		-7.53-2	
+170A	0.	1.		.0000				PBEAM	1034	2	.461906	1.	13.539
PBEAM	171	2	1980.0001.		9999.00	.001	+171	+1034	NO	1.	.371385		+1034A
+171	NO	1.0	1980.000		9999.00		+171A	+1034A	0.	1.		.217	
+171A	0.	1.		.0000				PBEAM	1035	2	0.1134	1.	.241
PBEAM	172	2	1.230	1.	84.87	.001	+172	+1035	NO	1.	0.0864		+1035A
+172	NO	1.0	1.000		57.12		+172A	+1035A	0.	1.		.162	
+172A	0.	1.		.2063				PBEAM	1036	2	.371385	1.	7.726
PBEAM	173	2	1.125	1.	41.92	.001	+173	+1036	NO	1.	.208421		+1036A
+173	NO	1.0	1.188		46.53		+173A	+1036A	0.	1.		.562	
+173A	0.	1.		-.0541				PBEAM	1037	2	0.0864	1.	.140
PBEAM	174	2	.750	1.	12.63	.001	+174	+1037	NO	1.	0.06364		+1037A
+174	NO	1.0	1.063		23.78		+174A	+1037A	0.	1.		.303	
+174A	0.	1.		-.3448				PBEAM	1038	2	0.54612	1.	5.551
PBEAM	175	2	1059.3001.		9999.00	.001	+175	+1038	NO	1.	0.58212		+1038A
+175	NO	1.0	841.500		9999.00		+175A	+1038A	0.	1.		-6.38-2	
+175A	0.	1.		.0000				PBEAM	1039	2	0.19404	1.	4.814
PBEAM	176	2	75.000	1.	2.98	.001	+176	+1039	NO	1.	0.15936		+1039A
+176	NO	1.0	79.000		12.10		+176A	+1039A	0.	1.		.196	
+176A	0.	1.		.0000				PBEAM	1040	2	0.15936	1.	2.212
PBEAM	177	2	79.000	1.	12.10	.001	+177	+1040	NO	1.	0.1296		+1040A
+177	NO	1.0	82.000		29.71		+177A	+1040A	0.	1.		.206	
+177A	0.	1.		.0000				PBEAM	1041	2	0.216	1.	.233
PBEAM	178	2	82.000	1.	29.71	.001	+178	+1041	NO	1.	0.1411		+1041A
+178	NO	1.0	85.000		29.71		+178A	+1041A	0.	1.		.419	
+178A	0.	1.		.0000				PBEAM	1043	2	.1148	1.	.239
PBEAM	179	2	85.000	9999.0	46.06	.001	+179	+1043	NO	1.	.118531		+1043A
+179	NO	1.0	90.000		46.06		+179A	+1043A	0.	1.		-3.20-2	
+179A	0.	1.		.0000				PBEAM	1045	2	0.02716	1.	3.2
PBEAM	180	2	90.000	9999.0	46.06	.001	+180	+1045	NO	1.	0.02891		+1045A
+180	NO	1.0	55.800		31.90		+180A	+1045A	0.	1.		-6.24-2	
+180A	0.	1.		.0000				PBEAM	1046	2	.118531	1.	.255
PBEAM	181	2	990.000	1.	9999.00	.001	+181	+1046	NO	1.	.103033		+1046A
+181	NO	1.0	990.000		9999.00		+181A	+1046A	0.	1.		.140	
+181A	0.	1.		.0000				PBEAM	1047	2	0.02568	1.	0.001
PBEAM	182	2	990.000	1.	9999.00	.001	+182	+1047	NO	1.	0.02513		+1047A
+182	NO	1.0	1.34778		14.325		+182A	+1047A	0.	1.		2.16-2	
+182A	0.	1.		1.32951				PBEAM	1048	2	.103033	1.	.193
PBEAM	1001	2	1.32951	1.	14.209	.001	+1001	+1048	NO	1.	.082328		+1048A
+1001	NO	1.0	1.32951		14.209		+1001A	+1048A	0.	1.		.223	
+1001A	0.	1.		1.36-2				PBEAM	1049	2	.082328	1.	.637
PBEAM	1002	2	1.32951	1.	14.209	.001	+1002	+1049	NO	1.	0.05289		+1049A
+1002	NO	1.0	1.23648		13.640		+1002A	+1049A	0.	1.		.435	
+1002A	0.	1.		7.25-2				PBEAM	1050	2	12.9	1.	.952
PBEAM	1003	2	1.23648	1.	13.640	.001	+1003	+1050	NO	1.	2.9		+1050A
+1003	NO	1.0	1.09137		12.836		+1003A	+1050A	0.	1.		1.266	
+1003A	0.	1.		.125				PBEAM	1051	2	0.41616	1.	4.768
PBEAM	1004	2	1.09137	1.	12.836	.001	+1004	+1051	NO	1.	0.39888		+1051A
+1004	NO	1.0	0.85176		11.727		+1004A	+1051A	0.	1.		4.24-2	
+1004A	0.	1.		.247				PBEAM	1052	2	0.28808	1.	3.968
PBEAM	1005	2	0.85176	1.	11.727	.001	+1005	+1052	NO	1.			+1052A
+1005	NO	1.0</											

+1052	NO	1.	0.22399	2.323		+1052A				+1099	NO	1.	0.50864	3.405		+1099A
+1052A	O.	1.	.250								+1099A	O.	.105			
PBEAM	1053	2	0.22399	1.	2.323		+1053				PBEAM	1100	2	0.32368	1.	2.951
+1053	NO	1.	0.13195	.877			+1053A				+1100	NO	1.	0.2702	1.360	+1100A
+1053A	O.	1.	.517								+1100A	O.	.180			+1101
PBEAM	1054	2	10.15	1.	1.104		+1054				PBEAM	1101	2	0.2895	1.	1.434
+1054	NO	1.	2.3	.15			+1054A				+1101	NO	1.	0.237	1.561	+1101A
+1054A	O.	1.	1.261								+1101A	O.	.199			+1102
PBEAM	1056	2	0.0772	1.	.112		+1056				PBEAM	1102	2	.803494	1.	19.105
+1056	NO	1.	.07868	.116			+1056A				+1102	NO	1.	.756148	18.318	+1102A
+1056A	O.	1.	-1.90-2								+1102A	O.	.1.	6.07-2		
PBEAM	1057	2	0.07868	1.	.116		+1057				PBEAM	1103	2	.868368	1.	3.7
+1057	NO	1.	0.06116	.0701			+1057A				+1103	NO	1.	.808308	3.656	+1103A
+1057A	O.	1.	.251								+1103A	O.	.1.	7.16-2		+1104
PBEAM	1058	2	0.06116	1.	.587		+1058				PBEAM	1104	2	0.56848	1.	7.616
+1058	NO	1.	.0332	.593	.173		+1058A				+1104	NO	1.	0.53648	2.977	+1104A
+1058A	O.	1.	.1.								+1104A	O.	.1.	5.79-2		+1105
PBEAM	1059	2	8.3	1.	.173		+1059				PBEAM	1105	2	0.53648	1.	1.985
+1059	NO	1.	1.8	.15			+1059A				+1105	NO	1.	0.49888	2.015	+1105A
+1059A	O.	1.	1.287								+1105A	O.	.1.	7.26-2		+1106
PBEAM	1060	2	0.6004	1.	1.874	3.	+1060				PBEAM	1106	2	0.49888	1.	2.217
+1060	NO	1.	0.513	1.073			+1060A				+1106	NO	1.	0.4536	2.014	+1106A
+1060A	O.	1.	.157								+1106A	O.	.1.	9.51-2		+1107
PBEAM	1061	2	0.513	1.	1.073	2.	+1061				PBEAM	1107	2	0.70875	1.	2.009
+1061	NO	1.	.2508	.265			+1061A				+1107	NO	1.	0.664	1.764	+1107A
+1061A	O.	1.	.687								+1107A	O.	.1.	6.52-2		+1108
PBEAM	1062	2	6.6	1.	.249		+1062				PBEAM	1108	2	0.3984	1.	.670
+1062	NO	1.	1.5	.15			+1062A				+1108	NO	1.	0.37695	.600	+1108A
+1062A	O.	1.	1.259								+1108A	O.	.1.	5.53-2		+1109
PBEAM	1071	2	.563180	1.	30.125		+1071				PBEAM	1109	2	0.37695	1.	.600
+1071	NO	1.	.456388	12.840			+1071A				+1109	NO	1.	0.3324	1.367	+1109A
+1071A	O.	1.	.209								+1109A	O.	.1.	.126		+1110
PBEAM	1072	2	.682631	1.	8.277		+1072				PBEAM	1110	2	0.35456	1.	1.367
+1072	NO	1.	.665175	7.859			+1072A				+1110	NO	1.	0.31472	.368	+1110A
+1072A	O.	1.	2.59-2								+1110A	O.	.1.	.119		+1111
PBEAM	1073	2	.554312	1.	7.859		+1073				PBEAM	1111	2	0.15736	1.	.242
+1073	NO	1.	.515704	6.811			+1073A				+1111	NO	1.	0.1264	1.156	+1111A
+1073A	O.	1.	7.15-2								+1111A	O.	.1.	.218		+1112
PBEAM	1074	2	.58975	1.	14.868		+1074				PBEAM	1112	2	0.1728	1.	.303
+1074	NO	1.	.531	6.135			+1074A				+1112	NO	1.	0.16064	.262	+1112A
+1074A	O.	1.	.105								+1112A	O.	.1.	7.29-2		+1113
PBEAM	1075	2	.675834	1.	32.711		+1075				PBEAM	1113	2	0.16064	1.	.222
+1075	NO	1.	.608902	25.555			+1075A				+1113	NO	1.	0.13784	.163	+1113A
+1075A	O.	1.	.104								+1113A	O.	.1.	.153		+1114
PBEAM	1076	2	.74152	1.	3.66		+1076				PBEAM	1114	2	0.13784	1.	.148
+1076	NO	1.	.64649	10.312			+1076A				+1114	NO	1.	0.12232	.117	+1114A
+1076A	O.	1.	.137								+1114A	O.	.1.	.119		+1115
PBEAM	1077	2	0.59676	1.	12.691		+1077				PBEAM	1115	2	0.12232	1.	.117
+1077	NO	1.	0.50976	2.256			+1077A				+1115	NO	1.	0.108	.991	+1115A
+1077A	O.	1.	.157								+1115A	O.	.1.	.124		+1116
PBEAM	1078	2	.531	1.	6.135		+1078				PBEAM	1116	2	.337714	1.	19.909
+1078	NO	1.	.504625	5.541			+1078A				+1116	NO	1.	.312716	19.868	+1116A
+1078A	O.	1.	5.09-2								+1116A	O.	.1.	7.69-2		+1117
PBEAM	1079	2	0.52481	1.	5.541		+1079				PBEAM	1117	2	0.85918	1.	3.590
+1079	NO	1.	0.49517	4.933			+1079A				+1117	NO	1.	0.77384	3.626	+1117A
+1079A	O.	1.	5.81-2								+1117A	O.	.1.	.105		+1118
PBEAM	1080	2	0.41899	1.	4.933		+1080				PBEAM	1118	2	0.54624	1.	6.20
+1080	NO	1.	0.36586	6.161			+1080A				+1118	NO	1.	0.49872	2.937	+1118A
+1080A	O.	1.	.135								+1118A	O.	.1.	9.10-2		+1119
PBEAM	1081	2	.902630	1.	30.774		+1081				PBEAM	1119	2	0.39482	1.	1.371
+1081	NO	1.	.842997	31.687			+1081A				+1119	NO	1.	0.35112	1.197	+1119A
+1081A	O.	1.	6.83-2								+1119A	O.	.1.	.117		+1120
PBEAM	1082	2	.756112	1.	9.525		+1082				PBEAM	1120	2	0.31416	1.	1.796
+1082	NO	1.	.694238	19.190			+1082A				+1120	NO	1.	0.27047	1.622	+1120A
+1082A	O.	1.	8.53-2								+1120A	O.	.1.	.149		+1121
PBEAM	1083	2	0.90882	1.	14.949		+1083				PBEAM	1121	2	0.36593	1.	.570
+1083	NO	1.	0.84618	2.210			+1083A				+1121	NO	1.	0.32453	.448	+1121A
+1083A	O.	1.	7.14-2								+1121A	O.	.1.	.120		+1122
PBEAM	1084	2	0.9402	1.	2.762		+1084				PBEAM	1122	2	0.23987	1.	.388
+1084	NO	1.	0.8128	2.065			+1084A				+1122	NO	1.	0.2193	.324	+1122A
+1084A	O.	1.	.145								+1122A	O.	.1.	8.96-2		+1123
PBEAM	1085	2	0.48768	1.	2.242		+1085				PBEAM	1123	2	2.193	1.	0.577
+1085	NO	1.	0.39912	2.251			+1085A				+1123	NO	1.	1.7255	0.319	+1123A
+1085A	O.	1.	.200								+1123A	O.	.1.	.239		+1124
PBEAM	1086	2	0.73172	1.	4.425		+1086				PBEAM	1124	2	1.7255	.1	0.319
+1086	NO	1.	0.7194	4.277			+1086A				+1124	NO	1.	1.411	0.186	+1124A
+1086A	O.	1.	1.70-2								+1124A	O.	.1.	.201		+1125
PBEAM	1087	2	0.7194	1.	4.277		+1087				PBEAM	1125	2	1.411	1.	0.186
+1087	NO	1.	0.66748	3.682			+1087A				+1125	NO	1.	1.122	0.37	+1125A
+1087A	O.	1.	7.49-2								+1125A	O.	.1.	.228		+1126
PBEAM	1088	2	0.48544	1.	3.682		+1088				PBEAM	1126	2	0.290	1.	.15
+1088	NO	1.	0.448	3.136			+1088A				+1126	NO	1.	0.230		+1126A
+1088A	O.	1.	8.02-2								+1126A	O.	.1.	.231		+1127
PBEAM	1089	2	0.616	1.	3.136		+1089				PBEAM	1127	2	0.230	1.	.15
+1089	NO	1.	0.59752	2.951			+1089A				+1127	NO	1.	0.180		+1127A
+1089A	O.	1.	3.05-2								+1127A	O.	.1.	.244		+1128
PBEAM	1090	2	0.59752	1.	3.139		+1090				PBEAM	1128	2	0.180	1.	.15
+1090	NO	1.	0.56496	2.968			+1090A				+1128	NO	1.	0.150		+1128A
+1090A	O.	1.	5.60-2								+1128A	O.	.1.	.182		+1131
PBEAM	1091	2	.964044	1.	26.163		+1091				PBEAM	1131	2	24.900	1.	2.334
+1091	NO	1.	.900046	33.946			+1091A				+1131	NO	1.0	41.600	4.497	+1131A
+1091A	O.	1.	6.87-2								+1131A	O.	.1.	-.502		+1132
PBEAM	1092	2	.80058	1.	8.240		+1092				PBEAM	1132	2	22.300	1.	1.258
+1092	NO	1.	.740025	7.040			+1092A				+1132	NO	1.0	43.800	6.091	+1132A
+1092A	O.	1.	7.86-2								+1132A	O.	.1.	-.651		+1133
PBEAM	1093	2	0.9867	1.	3.017		+1093				PBEAM	1133	2	43.800	1.	6.091
+1093	NO	1.	0.9295	2.678			+1093A				+1133	NO	1.0	46.400	8.843	+1133A
+1093A	O.	1.	5.97-2								+1133A	O.	.1.	-.058		+1134
PBEAM	1094	2	0.7605	1.	2.231		+1094				PBEAM	1134	2	46.4	100.	13.5
+1094	NO	1.	0.70344	1.909			+1094A				+1134	NO	1.	50.68		+1134A
+1094A	O.	1.	7.80-2								+1134A	O.	.1.	-8.82-2		+1135
PBEAM	1095	2	0.62528	1.	2.245		+1095				PBEAM	1135	2	20.300	1.	1.601
+1095	NO	1.	0.56416	5.554			+1095A		</							

+1139	NO	1.0	31.800	4.283	
+1139A	O.	1.			
PBEAM	1140	2	14.000	.836	
+1140	NO	1.0	28.200	2.827	
+1140A	O.	1.			
PBEAM	1141	2	28.200	1. 2.827	.001
+1141	NO	1.0	32.160	4.634	
+1141A	O.	1.			
PBEAM	1142	2	32.16	100. 7.94	10.
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PBEAM	1151	2	7.100	1. .042	
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PBEAM 2035	2	111.788 1.	.937	.001	+2035
+2035	NO	1.	98.900 1.	.714	
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+2048	NO	1.	217.882 1.	.520	
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PBEAM 2052	2	150.000 1.	18.200	.001	+2052
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PBEAM 2056	2	92.900 1.	.632	.001	+2056
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PSHEAR 76	2	.055812			
PSHEAR 201	1	.1917			

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PSHEAR	204	1	.01775	
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SPC1	3	1	383	384	385	386
SPC1	3	1	390	391	392	393
SPC1	3	156	36	42	50	431
SPC1	3	156	71	84	298	286
SPC1	3	156	163	164	153	154
SPC1	3	156	267	268	458	459
SPC1	4	156	283	284	282	281
SPC1	4	234	36	42	50	431
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SPC1	4	234	163	164	153	154
SPC1	4	234	267	268	458	459
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SPC1	5	4	3022			405
SPC1	5	456	251	256	261	262
SPC1	5	456	1001	1002	1003	1004
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SPC1	5	456	1044	1046	1047	1051
SPC1	5	456	1054	1057	1066	1069
SPC1	5	456	1055	1056	1060	1061
SPC1	5	456	1064	1065	1067	1068
SPC1	5	456	1074	1075	1076	1077
SPC1	5	456	1079	1114	1275	1276
SPC1	5	456	1081	1085	1086	1087
SPC1	5	456	1094	1114	1121	1088
SPC1	5	456	1096	1097	1098	1099
SPC1	5	456	1102	1103	1104	1105
SPC1	5	456	1108	1109	1110	1111
SPC1	5	456	1125	1126	1127	1112
SPC1	5	456	1128	1129	1130	1131
SPC1	5	456	1134	1135	1136	1132
SPC1	5	456	1140	1141	1142	1133
SPC1	5	456				1139

SPC1	5	456	1143			
SPC1	5	456	1178	1179	1180	1194
SPC1	5	456	1181	THRU	1193	
SPC1	5	456	1233	2233		
SPC1	5	456	1242	1243	1244	1245
SPC1	5	456	1251	THRU	1266	
SPC1	5	456	1292	1293	1464	1465
SPC1	5	456	1501	THRU	1526	1466
SPC1	5	456	2001	2002	2003	2004
SPC1	5	456	2007	2008	2010	2012
SPC1	5	456	2018	2173	2174	2175
SPC1	5	456	2019	THRU	2027	2176
SPC1	5	456	2029	2030	2032	2033
SPC1	5	456	2031	2034	2037	2040
SPC1	5	456	2044	2046	2047	2051
SPC1	5	456	2054	2057	2066	2069
SPC1	5	456	2055	2056	2060	2061
SPC1	5	456	2064	2065	2067	2068
SPC1	5	456	2074	2075	2076	2077
SPC1	5	456	2079	2114	2275	2276
SPC1	5	456	2081	2085	2086	2087
SPC1	5	456	2094	2114	2121	2088
SPC1	5	456	2096	2097	2098	2099
SPC1	5	456	2102	2103	2104	2105
SPC1	5	456	2109	2109	2110	2111
SPC1	5	456	2125	2126	2127	2112
SPC1	5	456	2128	2129	2130	2131
SPC1	5	456	2134	2135	2136	2132
SPC1	5	456	2140	2141	2142	2137
SPC1	5	456	2143			2138
SPC1	5	456	2178	2179	2180	2139
SPC1	5	456	2181	THRU	2193	
SPC1	5	456	2242	2243	2244	
SPC1	5	456	2251	THRU	2266	
SPC1	5	456	2292	2293	2464	
SPC1	5	456	2501	THRU	2526	
SPC1	5	123456	701	702	703	
SPCADD	1	3	5			
SPCADD	2	4	5			
SUPORT	42	156				
ENDDATA						

Appendix B.

Structural Finite Element Data for Typical LCO Case

ID LMTAS BLOCK 40 F-16 FLUTTER FEM TYPICAL LCO CASE

SOL 103

TIME 20

\$

CEND

\$

TITLE=F-16 1/2 AIRPLANE FINITE ELEMENT MODEL FOR FLUTTER ANALYSIS

SUBT1=ANTI-SYMMETRIC CENTERLINE BOUNDARY CONDITIONS // FULL XWING FUEL

LABEL=CONFIG 5 = MM11

DISP=ALL

ECHO=SORT

\$ DMIG VERTICAL TAIL STIFFNESS MATRIX

K2GG=VTAIL

\$ EIGENVALUE EXTRACTION

METHOD=1

\$ SYMMETRIC B.C. / SPC=2 FOR ANTISYMMETRIC

SPC=2

\$

\$ SET 203022=GRIDS USED IN FLUTTER ANALYSIS.

\$ ADD GRIDS 801 THROUGH 814 FOR DYNAMIC RESPONSE.

\$

SET 203022= 2, 3, 4, 5, 6,

9, 11, 13, 15, 17,

19, 20, 21, 26, 29,

33, 39, 44, 47, 51,

52, 53, 56, 60, 61,

62, 64, 65, 68, 72,

73, 74, 75, 77, 78,

81, 85, 86, 87, 89,

90, 91, 92, 93, 95,

102, 103, 104, 105, 106,

107, 108, 109, 110, 111,

112, 113, 122, 123, 124,

128, 129, 130, 131, 132,

133, 3004, 3006, 3009

\$ AIM-9/16S200 OR 16S200 ON TIP

\$

\$ GENERATE BUT DO NOT PRINT-

\$ EIGENVECTORS FOR FLUTTER ANALYSIS

\$

\$ PRINT-

\$ A-SET EIGENVECTORS FOR INSPECTION

\$

OUTPUT(PLOT)

CSCALE=1.8

PAPER SIZE=26. BY 20.

\$

\$ SET 10=ELEMENTS USED IN MODE PLOTS

\$

\$ FUSELAGE CENTERLINE

SET 10= 1 THRU 26,

\$ WING BOX

1001 THRU 1005,

1007,1010 THRU 1013,

1020,1023 THRU 1025,

1031,1034,1036,1043,1045,

1046,1048 THRU 1054,

1056 THRU 1062,

1071 THRU 1074,

1078,1079,1080,

1086 THRU 1090,

1099,1100,1101,

1075,1076,1077,

1081 THRU 1085,

1091 THRU 1097,

1102 THRU 1111,

1116 THRU 1125,

1126,1127,1128,

\$ LEADING EDGE FLAP / 1258 ACTUATOR

1131 THRU 1134,

1136,1137,1138,

1140,1141,1142,

1144,1145,1146,

1148 THRU 1151,

1152 THRU 1171,

\$ FLAPERON

1181 THRU 1185,

1187 THRU 1189,

1190 THRU 1194,

1196 THRU 1203,

1205 THRU 1207,

1209 THRU 1220,

1231 THRU 1238,

1251 THRU 1258,

1261 THRU 1268,

\$ HORIZONTAL TAIL

2001 THRU 2058,

\$ VERTICAL TAIL

2401 THRU 2460,

\$ 16S200 // STATION 1,9

3003 THRU 3009,

\$ AIM-9L // STATION 1,9

3014,3015

\$

\$ MAXIMUM DEFORMATION 35.

AXES MX,MY,Z

VIEW 60.0,30.,0.

FIND SCALE ORIGIN 10 SET 10

PLOT MODAL DEFO 0 SET 10 ORIGIN 10

\$

\$

BEGIN BULK

ASET 3500 123456

ASET 3501 123456

ASET1	1	163	153	154	155	156	71	286
ASET1	1	267						
ASET1	1	284	281					
ASET1	1	367	408	368	359	384		
ASET1	1	373	364	381	383			
ASET1	1	386	391	371	362	387	392	393
ASET1	1	389	369	360	385	390	370	361
ASET1	1	410						
ASET1	1	3050	3053	3057				
ASET1	1	3207	3210	3211	3213			
ASET1	2	3049	3054					
ASET1	2	3206	3212					
ASET1	3	6	17	5	15	4	13	3
ASET1	3	11	2	9				
ASET1	3	19	72	20	60	73	21	61
ASET1	3	39	47	56	68	81		
ASET1	3	74	51	62	75	26	52	64
ASET1	3	77	29	44	53	65	78	33
ASET1	3	85	86	87	88			
ASET1	3	90	103	109	89	102	108	
ASET1	3	95	107	113	93	106	112	124
ASET1	3	130	133	92	105	111	123	129
ASET1	3	132	91	104	110	122	128	131
ASET1	3	233						
ASET1	3	251	THRU	266				
ASET1	3	3017	3019	3022				
ASET1	3	3046	3050	3053	3057			
ASET1	3	3204	3210	3211	3213			
ASET1	4	3204	3211					
ASET1	5	153	154	155	156	71	286	284
ASET1	5	410						
ASET1	5	459						
ASET1	5	3211						
ASET1	6	437	281	410				
ASET1	6	458						
ASET1	6	3207	3211					
ASET1	6	3018						
ASET1	123456	3060						
CBAR	27	27	284	410	1.	1.	0.	
CBAR	2401	2401	407	367	0.	1.	1.	
CBAR	2402	2402	367	368	0.	1.	1.	
CBAR	2403	2403	368	369	0.	1.	1.	
CBAR	2404	2404	369	370	0.	1.	1.	
CBAR	2405	2405	370	371	0.	1.	1.	
CBAR	2406	2406	371	372	0.	1.	1.	
CBAR	2407	2407	372	373	0.	1.	1.	
CBAR	2408	2408	357	358	0.	1.	1.	
CBAR	2409	2409	358	359	0.	1.	1.	
CBAR	2410	2410	359	360	0.	1.	1.	
CBAR	2411	2411	360	361	0.	1.	1.	
CBAR	2412	2412	361	362	0.	1.	1.	
CBAR	2413	2413	362	363	0.	1.	1.	
CBAR	2414	2414	363	364	0.	1.	1.	
CBAR	2415	2415	409	375	0.	1.	1.	
CBAR	2416	2416	375	376	0.	1.	1.	
CBAR	2417	2417	376	377	0.	1.	1.	
CBAR	2418	2418	377	378	0.	1.	1.	
CBAR	2419	2419	378	379	0.	1.	1.	
CBAR	2420	2420	379	380	0.	1.	1.	
CBAR	2421	2421	380	381	0.	1.	1.	
CBAR	2422	2422	382	383	0.	1.	1.	
CBAR	2423	2423	384	385	0.	1.	1.	
CBAR	2424	2424	385	386	0.	1.	1.	
CBAR	2425	2425	386	387	0.	1.	1.	
CBAR	2426	2426	387	388	0.	1.	1.	
CBAR	2427	2427	389	390	0.	1.	1.	
CBAR	2428	2428	390	391	0.	1.	1.	
CBAR	2429	2429	391	392	0.	1.	1.	
CBAR	2430	2430	392	393	0.	1.	1.	
CBAR	2431	2431	407	357	0.	1.	1.	
CBAR	2432	2432	357	409	0.	1.	1.	
CBAR	2433	2433	367	358	0.	1.	1.	
CBAR	2434	2434	358	375	0.	1.	1.	
CBAR	2435	2435	375	384	0.	1.	1.	
CBAR	2436	2436	375	406	0.	1.	1.	
CBAR	2437	2437	406	408	0.	1.	1.	
CBAR	2438	2438	368	359	0.	1.	1.	
CBAR	2439	2439	359	376	0.	1.	1.	
CBAR	2440	2440	376	384	0.	1.	1.	
CBAR	2441	2441	369	360	0.	1.	1.	
CBAR	2442	2442	360	377	0.	1.	1.	
CBAR	2443	2443	377	385	0.	1.	1.	
CBAR	2444	2444	370	361	0.	1.	1.	
CBAR	2445	2445	361	378	0.	1.	1.	
CBAR	2446	2446	378	386	0.	1.	1.	
CBAR	2447	2447	371	362	0.	1.	1.	
CBAR	2448	2448	362	379	0.	1.	1.	
CBAR	2449	2449	372	363	0.	1.	1.	
CBAR	2450	2450	363	380	0.	1.	1.	
CBAR	2451	2451	380	382	0.	1.	1.	
CBAR	2452	2452	380	388	0.	1.	1.	
CBAR	2453	2453	373	364	0.	1.	1.	
CBAR	2454	2454	364	381	0.	1.	1.	
CBAR	2455	2455	381	383	0.	1.	1.	
CBAR	2456	2456	384	389	0.	1.	1.	
CBAR	2457	2457	385	390	0.	1.	1.	
CBAR	2458	2458	386	391	0.	1.	1.	
CBAR	2459	2459	387	392	0.	1.	1.	
CBAR	2460	2460	388	393	0.	1.	1.	
CBAR	3502	3502	3500	52	1.	1.	0.	
CBAR	3503	3502	3501	52	1.	1.	0.	
CBAR	1	1	163	164	1.	0.	0.	
CBAR	2	2	164	153	1.	0.	0.	

CBEAM	3	3	267	154	1.	0.	0.
CBEAM	4	4	154	155	1.	0.	0.
CBEAM	5	5	155	156	1.	0.	0.
CBEAM	6	6	268	36	1.	0.	0.
CBEAM	7	7	36	42	1.	0.	0.
CBEAM	8	8	42	50	1.	0.	0.
CBEAM	9	9	50	437	1.	0.	0.
CBEAM	10	10	437	59	1.	0.	0.
CBEAM	11	11	59	431	1.	0.	0.
CBEAM	12	12	431	71	1.	0.	0.
CBEAM	13	13	71	84	1.	0.	0.
CBEAM	14	14	84	298	1.	0.	0.
CBEAM	15	15	298	286	1.	0.	0.
CBEAM	16	16	286	117	1.	0.	0.
CBEAM	17	17	117	285	1.	1.	0.
CBEAM	18	18	285	283	1.	1.	0.
CBEAM	19	19	283	284	1.	1.	0.
CBEAM	20	20	284	282	1.	1.	0.
CBEAM	21	21	282	281	1.	1.	0.
CBEAM	22	22	281	405	1.	0.	0.
CBEAM	31	31	36	35	1.	1.	0.
CBEAM	32	32	42	41	1.	1.	0.
CBEAM	33	33	50	49	1.	1.	0.
CBEAM	34	34	59	58	1.	1.	0.
CBEAM	35	35	71	70	1.	1.	0.
CBEAM	36	36	84	83	1.	1.	0.
CBEAM	37	37	117	116	1.	1.	0.
CBEAM	38	38	34	31	1.	1.	0.
CBEAM	39	39	40	37	1.	1.	0.
CBEAM	40	40	48	45	1.	1.	0.
CBEAM	41	41	57	54	1.	1.	0.
CBEAM	42	42	69	66	1.	1.	0.
CBEAM	43	43	82	94	1.	1.	0.
CBEAM	44	44	94	119	1.	1.	0.
CBEAM	45	45	118	121	1.	1.	0.
CBEAM	46	46	115	79	1.	1.	0.
CBEAM	47	47	79	120	1.	1.	0.
CBEAM	48	48	120	114	1.	1.	0.
CBEAM	49	49	31	37	1.	1.	0.
+49BM	46						
CBEAM	50	50	37	45	1.	1.	0.
CBEAM	51	51	45	54	1.	1.	0.
CBEAM	52	52	54	66	1.	1.	0.
CBEAM	53	53	66	121	1.	1.	0.
+53BM	53						
CBEAM	54	54	121	114	1.	1.	0.
+54BM	56						
CBEAM	55	55	118	119	1.	1.	0.
CBEAM	56	56	119	120	1.	1.	0.
CBEAM	57	57	94	79	1.	1.	0.
CBEAM	141	141	467	274	1.	1.	0.
CBEAM	142	142	274	465	1.	1.	0.
CBEAM	143	143	465	275	1.	1.	0.
CBEAM	144	144	275	278	1.	1.	0.
CBEAM	145	145	278	280	1.	1.	0.
CBEAM	146	146	280	292	1.	1.	0.
CBEAM	147	147	292	114	1.	1.	0.
+147BM	456						
CBEAM	148	148	466	273	1.	1.	0.
CBEAM	149	149	273	464	1.	1.	0.
CBEAM	150	150	464	276	1.	1.	0.
CBEAM	151	151	276	279	1.	1.	0.
CBEAM	152	152	279	290	1.	1.	0.
CBEAM	153	153	290	293	1.	1.	0.
CBEAM	154	154	293	79	1.	1.	0.
+154BM	456						
CBEAM	160	160	295	300	1.	1.	0.
CBEAM	161	161	300	117	1.	1.	0.
CBEAM	162	162	300	79	1.	1.	0.
CBEAM	163	163	79	114	1.	1.	0.
CBEAM	164	164	283	295	1.	1.	0.
CBEAM	165	165	295	294	1.	1.	0.
CBEAM	166	166	293	292	1.	1.	0.
CBEAM	167	167	282	291	1.	1.	0.
CBEAM	168	168	290	280	1.	1.	0.
CBEAM	169	169	279	271	1.	1.	0.
+169BM	456						
CBEAM	170	170	271	278	1.	1.	0.
+170BM	56						
CBEAM	171	171	281	277	1.	1.	0.
CBEAM	172	172	276	275	1.	1.	0.
CBEAM	173	173	464	465	1.	1.	0.
CBEAM	174	174	466	467	1.	1.	0.
CBEAM	175	175	271	272	1.	1.	0.
+175BM	46						
CBEAM	176	176	273	241	1.	1.	0.
CBEAM	177	177	241	299	1.	1.	0.
CBEAM	178	178	299	272	1.	1.	0.
CBEAM	179	179	272	274	1.	1.	0.
CBEAM	180	180	274	233	1.	1.	0.
CBEAM	181	181	195	296	1.	1.	0.
+181BM	56						
CBEAM	182	182	296	196	1.	1.	0.
+182BM	56						
CBEAM	1001	1001	33	39	1.	0.	0.
CBEAM	1002	1002	39	47	1.	0.	0.
CBEAM	1003	1003	47	56	1.	0.	0.
CBEAM	1004	1004	56	68	1.	0.	0.
CBEAM	1005	1005	68	81	1.	0.	0.
CBEAM	1007	1007	32	38	1.	0.	0.
CBEAM	1009	1009	30	38	1.	0.	0.
CBEAM	1010	1010	38	46	1.	0.	0.
CBEAM	1011	1011	46	55	1.	0.	0.
CBEAM	1012	1012	55	67	1.	0.	0.
CBEAM	1013	1013	67	80	1.	0.	0.
CBEAM	1014	1014	181	182	1.	0.	0.
CBEAM	1015	1015	182	183	1.	0.	0.
CBEAM	1016	1016	183	184	1.	0.	0.
CBEAM	1017	1017	184	185	1.	0.	0.
CBEAM	1018	1018	185	186	1.	0.	0.
CBEAM	1020	1020	29	44	1.	0.	0.
CBEAM	1022	1022	27	44	1.	0.	0.
CBEAM	1023	1023	44	53	1.	0.	0.
CBEAM	1024	1024	53	65	1.	0.	0.

CBEAM	1025	1025	65	78	1.	0.	0.
CBEAM	1026	1026	187	188	1.	0.	0.
+1026BM	56						
CBEAM	1027	1027	188	189	1.	0.	0.
CBEAM	1028	1028	189	190	1.	0.	0.
CBEAM	1029	1029	190	191	1.	0.	0.
CBEAM	1031	1031	26	52	1.	0.	0.
CBEAM	1033	1033	25	52	1.	0.	0.
CBEAM	1034	1034	52	64	1.	0.	0.
CBEAM	1035	1035	64	245	1.	0.	0.
CBEAM	1036	1036	64	77	1.	0.	0.
CBEAM	1037	1037	245	77	1.	0.	0.
CBEAM	1038	1038	192	193	1.	0.	0.
CBEAM	1039	1039	193	63	1.	0.	0.
CBEAM	1040	1040	63	245	1.	0.	0.
CBEAM	1041	1041	245	76	1.	0.	0.
CBEAM	1043	1043	24	51	1.	0.	0.
CBEAM	1045	1045	23	51	1.	0.	0.
CBEAM	1046	1046	51	62	1.	0.	0.
CBEAM	1047	1047	22	62	1.	0.	0.
CBEAM	1048	1048	62	244	1.	0.	0.
CBEAM	1049	1049	244	75	1.	0.	0.
CBEAM	1050	1050	75	88	1.	0.	0.
CBEAM	1051	1051	21	61	1.	0.	0.
CBEAM	1052	1052	61	243	1.	0.	0.
CBEAM	1053	1053	243	74	1.	0.	0.
+1053BM	56						
CBEAM	1054	1054	74	87	1.	0.	0.
CBEAM	1056	1056	20	60	1.	0.	0.
CBEAM	1057	1057	60	242	1.	0.	0.
CBEAM	1058	1058	242	73	1.	0.	0.
+1058BM	56						
CBEAM	1059	1059	73	86	1.	0.	0.
CBEAM	1060	1060	19	143	1.	0.	0.
CBEAM	1061	1061	143	72	1.	0.	0.
CBEAM	1062	1062	72	85	1.	0.	0.
CBEAM	1071	1071	33	32	0.	1.	0.
CBEAM	1072	1072	32	30	0.	1.	0.
CBEAM	1073	1073	30	181	0.	1.	0.
CBEAM	1074	1074	181	29	0.	1.	0.
CBEAM	1075	1075	39	38	0.	1.	0.
CBEAM	1076	1076	38	182	0.	1.	0.
CBEAM	1077	1077	182	29	0.	1.	0.
CBEAM	1078	1078	29	27	0.	1.	0.
CBEAM	1079	1079	27	187	0.	1.	0.
CBEAM	1080	1080	187	26	0.	1.	0.
CBEAM	1081	1081	47	46	0.	1.	0.
CBEAM	1082	1082	46	183	0.	1.	0.
CBEAM	1083	1083	183	44	0.	1.	0.
CBEAM	1084	1084	44	188	0.	1.	0.
CBEAM	1085	1085	188	26	0.	1.	0.
CBEAM	1086	1086	26	25	0.	1.	0.
CBEAM	1087	1087	25	192	0.	1.	0.
CBEAM	1088	1088	192	24	0.	1.	0.
CBEAM	1089	1089	24	23	0.	1.	0.
CBEAM	1090	1090	23	22	0.	1.	0.
CBEAM	1091	1091	56	55	0.	1.	0.
CBEAM	1092	1092	55	184	0.	1.	0.
CBEAM	1093	1093	184	53	0.	1.	0.
CBEAM	1094	1094	53	189	0.	1.	0.
CBEAM	1095	1095	189	52	0.	1.	0.
CBEAM	1096	1096	52	193	0.	1.	0.
CBEAM	1097	1097	193	51	0.	1.	0.
CBEAM	1098	1098	51	22	0.	1.	0.
+1098BM	56						
CBEAM	1099	1099	22	21	0.	1.	0.
CBEAM	1100	1100	21	20	0.	1.	0.
CBEAM	1101	1101	20	19	0.	1.	0.
CBEAM	1102	1102	68	67	0.	1.	0.
CBEAM	1103	1103	67	185	0.	1.	0.
CBEAM	1104	1104	185	65	0.	1.	0.
CBEAM	1105	1105	65	190	0.	1.	0.
CBEAM	1106	1106	190	64	0.	1.	0.
CBEAM	1107	1107	64	63	0.	1.	0.
CBEAM	1108	1108	63	62	0.	1.	0.
CBEAM	1109	1109	62	61	0.	1.	0.
CBEAM	1110	1110	61	60	0.	1.	0.
CBEAM	1111	1111	60	19	0.	1.	0.
CBEAM	1112	1112	245	244	0.	1.	0.
CBEAM	1113	1113	244	243	0.	1.	0.
CBEAM	1114	1114	243	242	0.	1.	0.
CBEAM	1115	1115	242	143	0.	1.	0.
CBEAM	1116	1116	81	80	0.	1.	0.
CBEAM	1117	1117	80	186	0.	1.	0.
CBEAM	1118	1118	186	78	0.	1.	0.
CBEAM	1119	1119	78	191	0.	1.	0.
CBEAM	1120	1120	191	77	0.	1.	0.
CBEAM	1121	1121	77	76	0.	1.	0.
CBEAM	1122	1122	76	75	0.	1.	0.
CBEAM	1123	1123	75	74	0.	1.</	

+BM1146 5							
CBEAM	1147	1147	173	177	1.	0.	0.
CBEAM	1148	1148	2	194	1.	0.	0.
CBEAM	1149	1149	194	9	1.	0.	0.
CBEAM	1150	1150	9	20	1.	0.	0.
+BM1150 5							
CBEAM	1151	1151	1	8	1.	0.	0.
CBEAM	1152	1152	6	7	1.	0.	0.
CBEAM	1153	1153	176	6	1.	0.	0.
CBEAM	1154	1154	5	176	1.	0.	0.
CBEAM	1155	1155	175	5	1.	0.	0.
CBEAM	1156	1156	4	175	1.	0.	0.
CBEAM	1157	1157	174	4	1.	0.	0.
CBEAM	1158	1158	3	174	1.	0.	0.
CBEAM	1159	1159	173	3	1.	0.	0.
CBEAM	1160	1160	2	173	1.	0.	0.
CBEAM	1161	1161	1	2	1.	0.	0.
CBEAM	1162	1162	16	18	1.	0.	0.
CBEAM	1163	1163	180	16	1.	0.	0.
CBEAM	1164	1164	14	180	1.	0.	0.
CBEAM	1165	1165	179	14	1.	0.	0.
CBEAM	1166	1166	12	179	1.	0.	0.
CBEAM	1167	1167	178	12	1.	0.	0.
CBEAM	1168	1168	10	178	1.	0.	0.
CBEAM	1169	1169	177	10	1.	0.	0.
CBEAM	1170	1170	194	177	1.	0.	0.
CBEAM	1171	1171	8	194	1.	0.	0.
CBEAM	1181	1181	81	95	1.	0.	0.
+BM1181 456							
CBEAM	1182	1182	95	142	1.	0.	0.
CBEAM	1183	1183	142	101	1.	0.	0.
CBEAM	1184	1184	101	107	1.	0.	0.
CBEAM	1185	1185	107	113	1.	0.	0.
CBEAM	1186	1186	93	141	1.	0.	0.
CBEAM	1187	1187	141	100	1.	0.	0.
CBEAM	1188	1188	100	106	1.	0.	0.
CBEAM	1189	1189	106	112	1.	0.	0.
CBEAM	1190	1190	186	124	1.	0.	0.
+BM1190 456							
CBEAM	1191	1191	124	140	1.	0.	0.
CBEAM	1192	1192	140	127	1.	0.	0.
CBEAM	1193	1193	127	130	1.	0.	0.
CBEAM	1194	1194	130	133	1.	0.	0.
CBEAM	1195	1195	92	139	1.	0.	0.
CBEAM	1196	1196	139	99	1.	0.	0.
CBEAM	1197	1197	99	105	1.	0.	0.
CBEAM	1198	1198	105	111	1.	0.	0.
CBEAM	1199	1199	191	123	1.	0.	0.
+BM1199 456							
CBEAM	1200	1200	123	138	1.	0.	0.
CBEAM	1201	1201	138	126	1.	0.	0.
CBEAM	1202	1202	126	129	1.	0.	0.
CBEAM	1203	1203	129	132	1.	0.	0.
CBEAM	1204	1204	91	137	1.	0.	0.
CBEAM	1205	1205	137	98	1.	0.	0.
CBEAM	1206	1206	98	104	1.	0.	0.
CBEAM	1207	1207	104	110	1.	0.	0.
CBEAM	1208	1208	122	136	1.	0.	0.
CBEAM	1209	1209	136	125	1.	0.	0.
CBEAM	1210	1210	125	128	1.	0.	0.
CBEAM	1211	1211	128	131	1.	0.	0.
CBEAM	1212	1212	76	90	1.	0.	0.
+BM1212 456							
CBEAM	1213	1213	90	135	1.	0.	0.
CBEAM	1214	1214	135	97	1.	0.	0.
CBEAM	1215	1215	97	103	1.	0.	0.
CBEAM	1216	1216	103	109	1.	0.	0.
CBEAM	1217	1217	89	134	1.	0.	0.
CBEAM	1218	1218	134	96	1.	0.	0.
CBEAM	1219	1219	96	102	1.	0.	0.
CBEAM	1220	1220	102	108	1.	0.	0.
CBEAM	1231	1231	141	142	1.	0.	0.
CBEAM	1232	1232	140	141	1.	0.	0.
CBEAM	1233	1233	139	140	1.	0.	0.
CBEAM	1234	1234	138	139	1.	0.	0.
CBEAM	1235	1235	137	138	1.	0.	0.
CBEAM	1236	1236	136	137	1.	0.	0.
CBEAM	1237	1237	135	136	1.	0.	0.
CBEAM	1238	1238	134	135	1.	0.	0.
CBEAM	1241	1241	100	101	1.	0.	0.
CBEAM	1242	1242	127	100	1.	0.	0.
CBEAM	1243	1243	99	127	1.	0.	0.
CBEAM	1244	1244	126	99	1.	0.	0.
CBEAM	1245	1245	98	126	1.	0.	0.
CBEAM	1246	1246	125	98	1.	0.	0.
CBEAM	1247	1247	97	125	1.	0.	0.
CBEAM	1248	1248	96	97	1.	0.	0.
CBEAM	1251	1251	106	107	1.	0.	0.
CBEAM	1252	1252	130	106	1.	0.	0.
CBEAM	1253	1253	105	130	1.	0.	0.
CBEAM	1254	1254	129	105	1.	0.	0.
CBEAM	1255	1255	104	129	1.	0.	0.
CBEAM	1256	1256	128	104	1.	0.	0.
CBEAM	1257	1257	103	128	1.	0.	0.
CBEAM	1258	1258	102	103	1.	0.	0.
CBEAM	1261	1261	112	113	1.	0.	0.
CBEAM	1262	1262	133	112	1.	0.	0.
CBEAM	1263	1263	111	133	1.	0.	0.
CBEAM	1264	1264	132	111	1.	0.	0.
CBEAM	1265	1265	110	132	1.	0.	0.
CBEAM	1266	1266	131	110	1.	0.	0.
CBEAM	1267	1267	109	131	1.	0.	0.
CBEAM	1268	1268	108	109	1.	0.	0.
CBEAM	2001	2001	251	506	1.	1.	0.
+BM2001 456							
CBEAM	2002	2002	506	233	1.	1.	0.
CBEAM	2003	2003	233	517	1.	1.	0.
CBEAM	2004	2004	517	262	1.	1.	0.
+BM2004 456							
CBEAM	2005	2005	252	507	1.	1.	0.
+BM2005 456							
CBEAM	2006	2006	507	257	1.	1.	0.
CBEAM	2007	2007	257	518	1.	1.	0.
CBEAM	2008	2008	518	262	1.	1.	0.

+BM1150

+BM1181

+BM1190

+BM1199

+BM1212

+BM2001

+BM2004

+BM2005

+BM2008

+BM2008		456						
CBEAM	2009	2009	253	508	1.	1.	0.	+BM2009
+BM2009		456						
CBEAM	2010	2010	508	258	1.	1.	0.	
CBEAM	2011	2011	258	519	1.	1.	0.	
CBEAM	2012	2012	519	263	1.	1.	0.	+BM2012
+BM2012		456						
CBEAM	2013	2013	254	509	1.	1.	0.	+BM2013
+BM2013		456						
CBEAM	2014	2014	509	259	1.	1.	0.	+BM2016
CBEAM	2015	2015	259	520	1.	1.	0.	
CBEAM	2016	2016	520	264	1.	1.	0.	
+BM2016		456						
CBEAM	2017	2017	255	510	1.	1.	0.	+BM2017
+BM2017		456						
CBEAM	2018	2018	510	260	1.	1.	0.	+BM2020
CBEAM	2019	2019	260	521	1.	1.	0.	
CBEAM	2020	2020	521	265	1.	1.	0.	
+BM2020		456						
CBEAM	2021	2021	256	511	1.	1.	0.	+BM2021
+BM2021		456						
CBEAM	2022	2022	511	261	1.	1.	0.	+BM2022
+BM2022		456						
CBEAM	2023	2023	261	522	1.	1.	0.	+BM2023
+BM2023		456						
CBEAM	2024	2024	522	266	1.	1.	0.	+BM2024
+BM2024		456						
CBEAM	2031	2031	251	501	1.	1.	0.	+BM2031
+BM2031		456						
CBEAM	2032	2032	501	252	1.	1.	0.	+BM2040
CBEAM	2033	2033	252	502	1.	1.	0.	
CBEAM	2034	2034	502	253	1.	1.	0.	
CBEAM	2035	2035	253	503	1.	1.	0.	
CBEAM	2036	2036	503	254	1.	1.	0.	
CBEAM	2037	2037	254	504	1.	1.	0.	
CBEAM	2038	2038	504	255	1.	1.	0.	
CBEAM	2039	2039	255	505	1.	1.	0.	
CBEAM	2040	2040	505	256	1.	1.	0.	
+BM2040		456						
CBEAM	2041	2041	233	512	1.	1.	0.	
CBEAM	2042	2042	512	257	1.	1.	0.	
CBEAM	2043	2043	257	513	1.	1.	0.	
CBEAM	2044	2044	513	258	1.	1.	0.	
CBEAM	2045	2045	258	514	1.	1.	0.	
CBEAM	2046	2046	514	259	1.	1.	0.	
CBEAM	2047	2047	259	515	1.	1.	0.	
CBEAM	2048	2048	515	260	1.	1.	0.	
CBEAM	2049	2049	260	516	1.	1.	0.	
CBEAM	2050	2050	516	261	1.	1.	0.	
+BM2050		456						
CBEAM	2051	2051	262	523	1.	1.	0.	+BM2051
+BM2051		456						
CBEAM	2052	2052	523	263	1.	1.	0.	+BM2058
CBEAM	2053	2053	263	524	1.	1.	0.	
CBEAM	2054	2054	524	264	1.	1.	0.	
CBEAM	2055	2055	264	525	1.	1.	0.	
CBEAM	2056	2056	525	265	1.	1.	0.	
CBEAM	2057	2057	265	526	1.	1.	0.	
CBEAM	2058	2058	526	266	1.	1.	0.	
+BM2058		456						
CBEAM	3026	3026	19	3020	0.	1.	0.	
CBEAM	3027	3027	3016	3021	0.	1.	0.	
CBEAM	3028	3028	3017	3018	1.	0.	0.	
CBEAM	3029	3029	3018	3019	1.	0.	0.	
CBEAM	3030	3030	3019	3020	1.	0.	0.	
CBEAM	3031	3031	3020	3021	1.	0.	0.	
CBEAM	3032	3032	3021	3022	1.	0.	0.	
+3032		5						
CBEAM	3081	3081	21	3046	0.	0.	1.	+3081
+3081		56						
CBEAM	3082	3082	3046	61	0.	0.	1.	+3082
+3082		56						
CBEAM	3083	3083	3046	3049	0.	1.	0.	+3083
+3083		6						
CBEAM	3084	3083	3049	3054	0.	1.	0.	+3085
CBEAM	3085	3085	3053	3054	0.	0.	1.	
+3085		56						
CBEAM	3086	3085	3054	3055	0.	0.	1.	
+3086		56						
CBEAM	3087	3087	3047	3053	0.	1.	0.	+3087
+3087		6						
CBEAM	3088	3088	3047	3048	0.	0.	1.	+3090
CBEAM	3089	3089	3048	3055	0.	1.	0.	
CBEAM	3090	3090	3050	3051	0.	0.	1.	
+3090		5						
CBEAM	3091	3091	3051	3053	0.	0.	1.	+3093
CBEAM	3092	3092	3053	3055	0.	0.	1.	
CBEAM	3093	3093	3055	3057	0.	0.	1.	
+3093		5						
CBEAM	3094	3094	3050	3053	0.	0.	1.	+3094
+3094		56						
CBEAM	3095	3095	3053	3055	0.	0.	1.	+3096
CBEAM	3096	3096	3055	3057	0.	0.	1.	
+3096		56						
CBEAM	3097	3097	3050	3059	0.	1.	0.	
+3097		46						
CBEAM	3098	3098	3051	3061	0.	1.	0.	+3098
+3098		246						
CBEAM	3099	3099	3057	3062	0.	1.	0.	+3099
+3099		246						
CBEAM	3100	3100	3058	3059	0.	0.	1.	+3391
CBEAM	3101	3100	3059	3060	0.	0.	1.	
CBEAM	3102	3100	3060	3061	0.	0.	1.	
CBEAM	3103	3100	3061	3062	0.	0.	1.	
CBEAM	3391	3391	29	3196	0.	0.	1.	
+3391		456						
CBEAM	3392	3391	3196	182	0.	0.	1.	+3392
+3392		456						
CBEAM	3393	3391	182	3197	0.	0.	1.	+3393
+3393		456						
CBEAM	3394	3391	3197	38	0.	0.	1.	+3394
+3394		456						
CBEAM	3395	3391	44	3198	0.	0.	1.	+3395
+3395		456						

CBEAM	3396	3391	3198	183	0.	0.	1.	+3396
+3396		456						
CBEAM	3397	3391	183	3199	0.	0.	1.	+3397
+3397		456						
CBEAM	3398	3391	3199	46	0.	0.	1.	+3398
+3398		456						
CBEAM	3399	3391	3198	3200	0.	0.	1.	
CBEAM	3400	3391	3200	3196	0.	0.	1.	
CBEAM	3401	3391	3199	3202	0.	0.	1.	
CBEAM	3402	3391	3202	3197	0.	0.	1.	
CBEAM	3403	3391	3200	3201	0.	0.	1.	+3403
+3403		5						
CBEAM	3404	3391	3201	3202	0.	0.	1.	+3404
+3404		5						
CBEAM	3405	3405	3203	3204	0.	0.	1.	
CBEAM	3406	3405	3204	3205	0.	0.	1.	
CBEAM	3407	3407	3204	3206	0.	1.	0.	+3407
+3407		6						
CBEAM	3408	3407	3206	3207	0.	1.	0.	
CBEAM	3409	3409	3207	3208	0.	0.	1.	
CBEAM	3410	3409	3209	3212	0.	1.	0.	
CBEAM	3411	3405	3210	3211	0.	0.	1.	
CBEAM	3412	3409	3211	3212	0.	0.	1.	
CBEAM	3413	3405	3212	3213	0.	0.	1.	
CBEAM	5002	5002	153	267	1.	0.	0.	
CBEAM	5051	5051	156	458	1.	0.	0.	
CBEAM	5052	5052	458	459	1.	0.	0.	
CBEAM	5053	5053	459	268	1.	0.	0.	
CELAS2	61	36.6E6	34	5	35	5		
CELAS2	62	71.0E6	40	5	41	5		
CELAS2	63	94.1E6	48	5	49	5		
CELAS2	64	132.4E6	57	5	58	5		
CELAS2	65	110.0E6	69	5	70	5		
CELAS2	66	51.7E6	82	5	83	5		
CELAS2	67	5.0E6	115	5	116	5		
CELAS2	191	11.2E6	277	5	276	5		
CELAS2	192	22.0E6	291	5	290	5		
CELAS2	193	9.6E6	294	5	293	5		
CELAS2	194	156610.	298	3	195	3		
CELAS2	195	67829.	284	3	196	3		
CELAS2	1172	5650000.	17	4	30	4		
CELAS2	1173	5590000.	15	4	27	4		
CELAS2	1174	1600000.	13	4	25	4		
CELAS2	1175	2030000.	11	4	23	4		
CELAS2	1221	3307000.	142	4	141	4		
CELAS2	1222	268300.	141	4	140	4		
CELAS2	1223	137300.	140	4	139	4		
CELAS2	1224	105200.	139	4	138	4		
CELAS2	1225	85600.	138	4	137	4		
CELAS2	1226	69900.	137	4	136	4		
CELAS2	1227	57700.	136	4	135	4		
CELAS2	1228	40000.	135	4	134	4		
CELAS2	1229	6229750.	142	4	119	4		
CELAS2	3104	193.E6	3046	4	3054	4		
CELAS2	3414	1515.E5	3204	4	3207	4		
CELAS2	3415	1724.E5	3212	4	3208	4		
CELAS2	3416	580.4E5	3204	6	3207	6		
CELAS2	3417	2652.5E5	3208	6	3209	6		
CELAS2	3418	732.6E5	3208	5	3209	5		
CONM1	301	19	0					+301
+301		9.565						
CONM1	302	72	0					+302
+302		6.770						
CONM1	303	20	0					+303
+303		7.972						
CONM1	304	60	0					+304
+304		10.110						
CONM1	305	73	0					+305
+305		7.755						
CONM1	306	21	0					+306
+306		13.712						
CONM1	307	61	0					+307
+307		20.285						
CONM1	308	74	0					+308
+308		9.982						
CONM1	309	51	0					+309
+309		32.156						
CONM1	310	62	0					+310
+310		25.281						
CONM1	311	75	0					+311
+311		14.285						
CONM1	312	26	0					+312
+312		42.942						
CONM1	313	52	0					+313
+313		57.288						
CONM1	314	64	0					+314
+314		46.648						
CONM1	315	77	0					+315
+315		20.983						
CONM1	316	29	0					+316
+316		60.677						
CONM1	317	44	0					+317
+317		80.964						
CONM1	318	53	0					+318
+318		74.861						
CONM1	319	65	0					+319
+319		56.266						
CONM1	320	78	0					+320
+320		28.341						
CONM1	321	33	0					+321
+321		37.854						
CONM1	322	39	0					+322
+322		99.621						
CONM1	323	47	0					+323
+323		105.244						
CONM1	324	56	0					+324
+324		95.811						
CONM1	325	68	0					+325
+325		83.620						
CONM1	326	81	0					+326
+326		33.148						
CONM1	341	85	0					+341
+341		.6						
CONM1	342	86	0					+342

+342	1.6							
CONM1	343	87	0					+343
+343	1.8							
CONM1	344	88	0					+344
+344	1.							
CONM1	345	6	0					+345
+345	12.03							
CONM1	346	17	0					+346
+346	57.78							
CONM1	347	5	0					+347
+347	10.08							
CONM1	348	15	0					+348
+348	42.72							
CONM1	349	4	0					+349
+349	6.92							
CONM1	350	13	0					+350
+350	27.67							
CONM1	351	3	0					+351
+351	5.17							
CONM1	352	11	0					+352
+352	27.65							
CONM1	353	2	0					+353
+353	4.08							
CONM1	354	9	0					+354
+354	3.71							
CONM1	355	95	0					+355
+355	9.133							
CONM1	356	107	0					+356
+356	6.765							
CONM1	357	113	0					+357
+357	.022							
CONM1	358	93	0					+358
+358	10.32							
CONM1	359	106	0					+359
+359	10.12							
CONM1	360	112	0					+360
+360	.149							
CONM1	361	124	0					+361
+361	5.816							
CONM1	362	130	0					+362
+362	7.986							
CONM1	363	133	0					+363
+363	.998							
CONM1	364	92	0					+364
+364	4.56							
CONM1	365	105	0					+365
+365	6.797							
CONM1	366	111	0					+366
+366	.952							
CONM1	367	123	0					+367
+367	3.296							
CONM1	368	129	0					+368
+368	4.727							
CONM1	369	132	0					+369
+369	.647							
CONM1	370	91	0					+370
+370	2.069							
CONM1	371	104	0					+371
+371	3.014							
CONM1	372	110	0					+372
+372	.477							
CONM1	373	122	0					+373
+373	1.784							
CONM1	374	128	0					+374
+374	2.632							
CONM1	375	131	0					+375
+375	.435							
CONM1	376	90	0					+376
+376	1.644							
CONM1	377	103	0					+377
+377	2.354							
CONM1	378	109	0					+378
+378	.272							
CONM1	379	89	0					+379
+379	.651							
CONM1	380	102	0					+380
+380	1.075							
CONM1	381	108	0					+381
+381	.284							
CONM1	391	163	0					+391
+391	314.21							
CONM1	392	153	0					+392
+392	463.77							
CONM1	393	154	0					+393
+393	870.68							
CONM1	394	155	0					+394
+394	1299.38							
CONM1	395	156	0					+395
+395	1545.78							
CONM1	396	42	0					+396
+396	1799.25							
CONM1	397	71	0					+397
+397	1412.77							
CONM1	398	286	0					+398
+398	893.77							
CONM1	399	284	0					+399
+399	335.19							
CONM1	400	281	0					

+412A		498740.	
CONM1	413	155	0
+413			
+413A		233410.	
CONM1	414	156	0
+414			
+414A		865169.	
CONM1	415	42	0
+415			
+415A		1051483.	
CONM1	416	71	0
+416			
+416A		1042917.	
CONM1	417	286	0
+417			
+417A		556929.	
CONM1	418	284	0
+418			
+418A		756147.	
CONM1	430	195	0
+430		-82.94	
CONM1	431	296	0
+431			
CONM1	432	296	0
+432		2073.44	
CONM1	433	42	0
CONM1	434	437	0
+434			
+434A			
CONM1	435	281	0
+435			
+435A			
CONM1	436	410	0
+436			
+436A		502624.	
CONM1	437	410	0
+437			
+437A			
CONM1	438	410	0
CONM1	446	251	0
+446		4.65	
CONM1	447	252	0
+447		5.123	
CONM1	448	253	0
+448		4.812	
CONM1	449	254	0
+449		3.069	
CONM1	450	255	0
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+451		2.547	
CONM1	452	233	0
+452		176.302	
CONM1	453	257	0
+453		31.053	
CONM1	454	258	0
+454		17.674	
CONM1	455	259	0
+455		11.742	
CONM1	456	260	0
+456		7.391	
CONM1	457	261	0
+457		2.877	
CONM1	458	262	0
+458		3.675	
CONM1	459	263	0
+459		3.064	
CONM1	460	264	0
+460		2.838	
CONM1	461	265	0
+461		2.73	
CONM1	462	266	0
+462		.976	
CONM1	501	407	0
CONM1	502	409	0
CONM1	503	367	0
CONM1	504	408	0
CONM1	505	368	0
CONM1	506	359	0
CONM1	507	384	0
CONM1	508	389	0
CONM1	509	369	0
CONM1	510	360	0
CONM1	511	385	0
CONM1	512	390	0
CONM1	513	370	0
CONM1	514	361	0
CONM1	515	386	0
CONM1	516	391	0
CONM1	517	371	0
CONM1	518	362	0
CONM1	519	387	0
CONM1	520	392	0
CONM1	521	393	0
CONM1	522	373	0
CONM1	523	364	0
CONM1	524	381	0
CONM1	525	383	0
CONM1	526	281	0
+526			
CONM1	3042	3018	56.69
+3042		56.69	
+3042A		0.	
CONM1	3043	3019	
+3043		-4.70	
CONM1	3044	3022	35.01
+3044		37.01	
CONM1	3045	3060	200.
+3045		200.	
+3045A		1947.	
CONM1	3047	3017	
+3047		.010	
CONM1	3117	3046	0
+3117		25.4	

CONM1	3118	3049	0		25.4	
CONM1	3119	3050	0	46.57		+3119
+3119		46.57				
CONM1	3120	3053	0	9.79		+3120
+3120		-2.91				
CONM1	3121	3054	0		67.50	+3122
CONM1	3122	3057	0	23.84		+3127
+3122		23.84				
CONM1	3427	3204	0			
+3427		208.0			125.E3	
CONM1	3428	3206	0			208.
CONM1	3429	3207	0	208.0		
+3429						+3429
+3429A						+3429A
CONM1	3430	3210	0	.01		125.E3
+40430		.01				+40430
CONM1	3431	3211	0	229.3		+40431
+40431		229.3			561149.	+40431A
+40431A		32000.				561149.
CONM1	3432	3212	0		231.3	
CONM1	3433	3213	0	2.0		+40433
+40433		2.0				
CONM2	3501	3500		502.	0.	0.
+000001	648549.2		8160.8			649152.0
CONM2	3504	3501		138.	0.	0.
+000003	66538.01		6769.7			62828.60
CONROD	183	272	2			16.0875
CONROD	2201	233	2		.0001	
CONROD	2202	233	2		.0001	
CONROD	2203	251	2		.0001	
CONROD	2204	251	2		.0001	
CONROD	2205	252	2		.0001	
CONROD	2206	252	2		.0001	
CONROD	2207	253	2		.0001	
CONROD	2208	253	2		.0001	
CONROD	2209	254	2		.0001	
CONROD	2210	254	2		.0001	
CONROD	2211	255	2		.0001	
CONROD	2212	255	2		.0001	
CONROD	2213	256	2		.0001	
CONROD	2214	256	2		.0001	
CONROD	2215	257	2		.0001	
CONROD	2216	257	2		.0001	
CONROD	2217	258	2		.0001	
CONROD	2218	258	2		.0001	
CONROD	2219	259	2		.0001	
CONROD	2220	259	2		.0001	
CONROD	2221	260	2		.0001	
CONROD	2222	260	2		.0001	
CONROD	2223	261	2		.0001	
CONROD	2224	261	2		.0001	
CONROD	2225	262	2		.0001	
CONROD	2226	262	2		.0001	
CONROD	2227	263	2		.0001	
CONROD	2228	263	2		.0001	
CONROD	2229	264	2		.0001	
CONROD	2230	264	2		.0001	
CONROD	2231	265	2		.0001	
CONROD	2232	265	2		.0001	
CONROD	2233	266	2		.0001	
CONROD	2234	266	2		.0001	
CONROD	3033	3018	2			20.
CONROD	3034	3020	2			20.
COR01R	5	701	702	703		
COR02C	*3				-63.574	-294.247
*COR03A	0.				-143.398002	-351.530085
+COR03B	-63.574	-294.247	100.			
COR02R	1	0			-62.153	-293.227100.
*COR01	19.092002				-234.923915	0.
COR02R	7	0			-41.5	-378.02 100.
*COR07	57.2946361				-362.5403399	0.
CQUAD4	601	601	1033	1039	1038	1032
CQUAD4	602	602	1039	1047	1046	1038
CQUAD4	603	603	1047	1056	1055	1046
CQUAD4	604	604	1056	1068	1067	1055
CQUAD4	605	605	1068	1081	1080	1067
CQUAD4	606	606	1081	1093	1092	1080
CQUAD4	607	607	1093	1106	1105	1092
CQUAD4	608	608	1106	1119	1118	1105
CQUAD4	609	609	1119	1132	1131	1105
CQUAD4	610	610	1132	1145	1144	1105
CQUAD4	611	611	1145	1158	1157	1105
CQUAD4	612	612	1158	1171	1170	1105
CQUAD4	613	613	1171	1184	1183	1105
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CQUAD4	615	615	1197	1210	1209	1105
CQUAD4	616	616	1210	1223	1222	1105
CQUAD4	617	617	1223	1236	1235	1105
CQUAD4	618	618	1236	1249	1248	1105
CQUAD4	619	619	1249	1262	1261	1105
CQUAD4	620	620	1262	1275	1274	1105
CQUAD4	621	621	1275	1288	1287	1105
CQUAD4	622	622	1288	1301	1300	1105
CQUAD4	623	623	1301	1314	1313	1105
CQUAD4	624	624	1314	1327	1326	1105
CQUAD4	625	625	1327	1340	1339	1105
CQUAD4	626	626	1340	1353	1352	1105
CQUAD4	627	627	1353	1366	1365	1105
CQUAD4	628	628	1366	1379	1378	1105
CQUAD4	629	629	1379	1392	1391	1105
CQUAD4	630	630	1392	1405	1404	1105
CQUAD4	631	631	1405	1418	1417	1105
CQUAD4	632	632	1418	1431	1430	1105
CQUAD4	633	633	1431	1444	1443	1105
CQUAD4	634	634	1444	1457	1456	1105
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CQUAD4	637	637	1483	1496	1495	1105
CQUAD4	638	638	1496	1509	1508	1105
CQUAD4	639	639	1509	1522	1521	1105
CQUAD4	640	640	1522	1535	1534	1105
CQUAD4	641	641	1535	1548	1547	1105
CQUAD4	642	642	1548	1561	1560	1105
CQUAD4	643	643	1561	1574	1573	1105
CQUAD4	644	644	1574	1587	1586	1105
CQUAD4	645	645	1587	1600	1599	1105
CQUAD4	646	646	1600	1613	1612	1105
CQUAD4	647	647	1613	1626	1625	1105
CQUAD4	648	648	1626	1639	1638	1105
CQUAD4	649	649	1639	1652	1651	1105
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CQUAD4	652	652	1678	1691	1690	1105
CQUAD4	653	653	1691	1704	1703	1105
CQUAD4	654	654	1704	1717	1716	1105
CQUAD4	655	655	1717	1730	1729	1105
CQUAD4	656	656	1730	1743	1742	1105
CQUAD4	657	657	1743	1756	1755	1105
CQUAD4	658	658	1756	1769	1768	1105

CQUAD4	669	669	1130	1133	1111	1105
CQUAD4	670	670	1139	1099	1126	1138
CQUAD4	671	671	1099	1105	1129	1126
CQUAD4	672	672	1105	1111	1132	1129
CQUAD4	673	673	1138	1126	1098	1137
CQUAD4	674	674	1126	1129	1104	1098
CQUAD4	675	675	1129	1132	1110	1104
CQUAD4	676	676	1137	1098	1125	1136
CQUAD4	677	677	1098	1104	1128	1125
CQUAD4	678	678	1104	1110	1131	1128
CQUAD4	679	679	1136	1125	1097	1135
CQUAD4	680	680	1125	1128	1103	1097
CQUAD4	681	681	1128	1131	1109	1103
CQUAD4	682	682	1135	1097	1096	1134
CQUAD4	683	683	1097	1103	1102	1096
CQUAD4	684	684	1103	1109	1108	1102
CQUAD4	1601	601	2033	2039	2038	2032
CQUAD4	1602	602	2039	2047	2046	2038
CQUAD4	1603	603	2047	2056	2055	2046
CQUAD4	1604	604	2056	2068	2067	2055
CQUAD4	1605	605	2068	2081	2080	2067
CQUAD4	1607	607	2038	2182	2181	2030
CQUAD4	1608	608	2038	2046	2183	2182
CQUAD4	1609	609	2046	2055	2184	2183
CQUAD4	1610	610	2055	2067	2185	2184
CQUAD4	1611	611	2067	2080	2186	2185
CQUAD4	1613	613	2182	2183	2044	2029
CQUAD4	1614	614	2183	2184	2053	2044
CQUAD4	1615	615	2184	2185	2065	2053
CQUAD4	1616	616	2185	2186	2078	2065
CQUAD4	1618	618	2027	2044	2188	2187
CQUAD4	1619	619	2044	2053	2189	2188
CQUAD4	1620	620	2053	2065	2190	2189
CQUAD4	1621	621	2065	2078	2191	2190
CQUAD4	1623	623	2188	2189	2052	2026
CQUAD4	1624	624	2189	2190	2064	2052
CQUAD4	1625	625	2190	2191	2077	2064
CQUAD4	1627	627	2025	2052	2193	2192
CQUAD4	1628	628	2052	2064	2063	2193
CQUAD4	1632	632	2192	2193	2051	2024
CQUAD4	1633	633	2193	2063	2062	2051
CQUAD4	1634	634	2063	2245	2244	2062
CQUAD4	1635	635	2245	2076	2075	2244
CQUAD4	1639	639	2062	2061	2021	2022
CQUAD4	1640	640	2062	2244	2243	2061
CQUAD4	1641	641	2244	2075	2074	2243
CQUAD4	1643	643	2021	2061	2060	2020
CQUAD4	1644	644	2061	2243	2242	2060
CQUAD4	1645	645	2243	2074	2073	2242
CQUAD4	1648	648	2060	2242	2143	2019
CQUAD4	1649	649	2242	2073	2072	2143
CQUAD4	1661	661	2142	2101	2100	2141
CQUAD4	1662	662	2101	2107	2106	2100
CQUAD4	1663	663	2107	2113	2112	2106
CQUAD4	1664	664	2141	2100	2127	2140
CQUAD4	1665	665	2100	2106	2130	2127
CQUAD4	1666	666	2106	2112	2133	2130
CQUAD4	1667	667	2140	2127	2099	2139
CQUAD4	1668	668	2127	2130	2105	2099
CQUAD4	1669	669	2130	2133	2111	2105
CQUAD4	1670	670	2139	2099	2126	2138
CQUAD4	1671	671	2099	2105	2129	2126
CQUAD4	1672	672	2105	2111	2132	2129
CQUAD4	1673	673	2138	2126	2098	2137
CQUAD4	1674	674	2126	2129	2104	2098
CQUAD4	1675	675	2129	2132	2110	2104
CQUAD4	1676	676	2137	2098	2125	2136
CQUAD4	1677	677	2098	2104	2128	2125
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CQUAD4	1679	679	2136	2125	2097	2135
CQUAD4	1680	680	2125	2128	2103	2097
CQUAD4	1681	681	2128	2131	2109	2103
CQUAD4	1682	682	2135	2097	2096	2134
CQUAD4	1683	683	2097	2103	2102	2096
CQUAD4	1684	684	2103	2109	2108	2102
CQUAD8	701	701	1257	1252	1251	1233
+701	1506	1512				1507
CQUAD8	702	702	1252	1257	1258	1253
+702	1508	1502				1507
CQUAD8	703	703	1253	1258	1259	1254
+703	1509	1503				1508
CQUAD8	704	704	1254	1259	1260	1255
+704	1510	1504				1509
CQUAD8	705	705	1255	1260	1261	1256
+705	1511	1505				1510
CQUAD8	707	707	1257	1262	1263	1258
+707	1519	1513				1518
CQUAD8	708	708	1258	1263	1264	1259
+708	1520	1514				1519
CQUAD8	709	709	1259	1264	1265	1260
+709	1521	1515				1520
CQUAD8	710	710	1260	1265	1266	1261
+710	1522	1516				1521
CQUAD8	1701	701	2257	2252	2251	2233
+1701	2506	2512				2507
CQUAD8	1702	702	2252	2257	2258	2253
+1702	2508	2502				2507
CQUAD8	1703	703	2253	2258	2259	2254
+1703	2509	2503				2508
CQUAD8	1704	704	2254	2259	2260	2255
+1704	2510	2504				2509
CQUAD8	1705	705	2255	2260	2261	2256
+1705	2511	2505				2510
CQUAD8	1707	707	2257	2262	2263	2258
+1707	2519	2513				2518
CQUAD8	1708	708	2258	2263	2264	2259
+1708	2520	2514				2519
CQUAD8	1709	709	2259	2264	2265	2260
+1709	2521	2515				2520
CQUAD8	1710	710	2260	2265	2266	2261
+1710	2522	2516				2521
CSHEAR	71	71	1034	1040	1037	1031
CSHEAR	72	72	1040	1048	1045	1037
CSHEAR	73	73	1048	1057	1054	1045

CSHEAR	74	74	1057	1069	1066	1054
CSHEAR	75	75	1069	1082	1121	1066
CSHEAR	76	76	1094	1079	1114	1121
CSHEAR	77	71	2034	2040	2037	2031
CSHEAR	78	72	2040	2048	2045	2037
CSHEAR	79	73	2048	2057	2054	2045
CSHEAR	80	74	2057	2069	2066	2054
CSHEAR	81	75	2069	2082	2121	2066
CSHEAR	82	76	2094	2079	2114	2121
CSHEAR	201	201	1465	1464	1466	1467
CSHEAR	202	202	1275	1276	1464	1465
CSHEAR	203	203	1280	1290	1276	1275
CSHEAR	204	204	1114	1079	1293	1292
CSHEAR	205	201	2465	2464	2466	2467
CSHEAR	206	202	2275	2276	2464	2465
CSHEAR	207	203	2280	2290	2276	2275
CSHEAR	208	204	2114	2079	2293	2292
CSHEAR	642	642	1075	1088	1087	1074
CSHEAR	646	646	1074	1087	1086	1073
CSHEAR	650	650	1073	1086	1085	1072
CSHEAR	651	651	1007	1018	1016	1006
CSHEAR	652	652	1006	1016	1180	1176
CSHEAR	653	653	1176	1180	1014	1005
CSHEAR	654	654	1005	1014	1179	1175
CSHEAR	655	655	1175	1179	1012	1004
CSHEAR	656	656	1004	1012	1178	1174
CSHEAR	657	657	1174	1178	1010	1003
CSHEAR	658	658	1003	1010	1177	1173
CSHEAR	659	659	1173	1177	1194	1002
CSHEAR	660	660	1002	1194	1008	1001
CSHEAR	1642	642	2075	2088	2087	2074
CSHEAR	1646	646	2074	2087	2086	2073
CSHEAR	1650	650	2073	2086	2085	2072
CSHEAR	1651	651	2007	2018	2016	2006
CSHEAR	1652	652	2006	2016	2180	2176
CSHEAR	1653	653	2176	2180	2014	2005
CSHEAR	1654	654	2005	2014	2179	2175
CSHEAR	1655	655	2175	2179	2012	2004
CSHEAR	1656	656	2004	2012	2178	2174
CSHEAR	1657	657	2174	2178	2010	2003
CSHEAR	1658	658	2003	2010	2177	2173
CSHEAR	1659	659	2173	2177	2194	2002
CSHEAR	1660	660	2002	2194	2008	2001
CSHEAR	3105	3105	3063	3064	3066	3065
CSHEAR	3106	3105	3067	3069	3070	3069
CTRIA3	606	606	1032	1038	1030	
CTRIA3	612	612	1181	1182	1029	
CTRIA3	617	617	1029	1044	1027	
CTRIA3	622	622	1187	1188	1026	
CTRIA3	626	626	1026	1052	1025	
CTRIA3	629	629	1064	1245	1063	
CTRIA3	630	630	1064	1077	1245	
CTRIA3	631	631	1077	1076	1245	
CTRIA3	636	636	1051	1023	1024	
CTRIA3	637	637	1051	1022	1023	
CTRIA3	638	638	1062	1022	1051	
CTRIA3	647	647	1019	1020	1060	
CTRIA3	1606	606	2032	2038	2030	
CTRIA3	1612	612	2181	2182	2029	
CTRIA3	1617	617	2029	2044	2027	
CTRIA3	1622	622	2187	2188	2026	
CTRIA3	1626	626	2026	2052	2025	
CTRIA3	1629	629	2064	2245	2063	
CTRIA3	1630	630	2064	2077	2245	
CTRIA3	1631	631	2077	2076	2245	
CTRIA3	1636	636	2051	2023	2024	
CTRIA3	1637	637	2051	2022	2023	
CTRIA3	1638	638	2062	2022	2051	
CTRIA3	1647	647	2019	2020	2060	
CTRIA6	706	706	1262	1257	1233	1518
+706	99.5					1512
CTRIA6	1706	706	2262	2257	2233	2518
+1706	99.5					2512
DMIG	*VTAIL	0	6	1	0	2517
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*9001	357					+1706
DMIG	*VTAIL		358			
*9002	357					
*9003	358					
DMIG	*VTAIL		359			
*9004	357					
*9005	358					
*9006	359					
DMIG	*VTAIL	</				

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DMIG	*VTAIL	369	1
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DMIG	*VTAIL	380	1
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0.874634E+04			
0.134833E+04			
0.310222E-01			
-236734E+00			
0.235626E+01			
0.161871E+02			
0.211136E+02			
-961292E+03			
0.278446E+03			
0.102905E+02			
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-225652E+02			
-362756E+03			
-513037E+05			
-124016E+04			
-303660E+04			
-859051E+03			
0.185899E+02			
-106061E+03			
0.590076E+03			
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0.483130E+05			
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0.103213E+02			
0.166475E+01			
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-236861E+00			
0.275941E-01			
-144762E-02			
-112184E-02			
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-269597E+01			
-204739E+01			
-141008E+00			
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-242338E-02			
-297737E-03			
0.292616E+04			
-299786E+02			
-146567E+01			
0.271617E-01			
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0.623463E-03			
-154917E-03			
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-168094E-05			
-237751E+04			
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DMIG	*VTAIL	391	1	*9471
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*9598	370	1	-.101680E+02	*9599
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*9601	373	1	-.214697E-01	*9602
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*9651
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GRID	136	0		-120.773-391.723	.000 7
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GRID	139	0		-85.817 -386.246	.000 7
GRID	140	0		-70.262 -383.809	.000 7
GRID	141	0		-53.000 -381.104	.000 7
GRID	142	0		-41.500 -379.302	.000 7
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GRID	155	0		.000 -200.00	.000 0
GRID	156	0		.000 -252.50	.000 0
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GRID	175	5		-58.250 13.701	.000 0
GRID	176	5		-19.500 15.863	.000 0
GRID	177	5		-16.2503.247	.000 0
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GRID	179	5		-58.250 3.643	.000 0
GRID	180	5		-19.500 3.908	.000 0
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GRID	182	0		-71.000 -313.799	.000 0
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GRID	184	0		-71.000 -345.799	.000 0
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GRID	272	0		-36.000 -497.500.000	.000 0
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GRID	437	0	.0000	-325.40.000	0	
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GRID	466	0	-29.250	-502.250.000	0	
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GRID	515	0	-89.796	-523.4070.	0	
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GRID	522	0	-106.495	-540.3680.	0	
GRID	523	0	-50.28	-541.8760.	0	
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GRID	1004	5	-75.750	12.725	.700	0
GRID	1005	5	-40.750	14.678	.895	0
GRID	1006	5	0.000	17.047	1.115	0
GRID	1007	5	24.947	18.341	1.245	0
GRID	1008	5	-141.0943.076	.845	0	0
GRID	1010	5	-100.7503.353	1.150	0	0
GRID	1012	5	-75.750	3.524	1.410	0
GRID	1014	5	-40.750	3.763	1.765	0
GRID	1016	5	0.000	4.054	2.190	0
GRID	1018	5	14.758	4.143	2.080	0
GRID	1019	0	-180.000-381.378.790	0	0	0
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GRID	1023	0	-143.035-356.3241.358	1	0	0
GRID	1024	0	-139.738-354.0031.400	0	0	0
GRID	1025	0	-122.591-341.9321.635	1	0	0
GRID	1026	0	-120.000-340.1081.663	0	0	0
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GRID	2005	5	-40.750	14.678	-895	0
GRID	2006	5	0.000	17.047	-1.115	0
GRID	2007	5	24.947	18.341	-1.245	0
GRID	2008	5	-141.0943.076	-845	0	
GRID	2010	5	-100.7503.353	-1.150	0	
GRID	2012	5	-75.750	3.524	-1.410	0
GRID	2014	5	-40.750	3.763	-1.765	0
GRID	2016	5	0.000	4.054	-2.190	0
GRID	2018	5	14.758	4.143	-2.080	0
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GRID	2021	0	-157.000	-366.154	-1.156	0
GRID	2022	0	-147.640	-359.565	-1.284	0
GRID	2023	0	-143.035	-356.324	-1.358	1
GRID	2024	0	-139.738	-354.003	-1.400	0
GRID	2025	0	-122.591	-341.932	-1.635	1
GRID	2026	0	-120.000	-340.108	-1.663	0
GRID	2027	0	-93.970	-321.785	-2.018	1
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GRID	2030	0	-60.647	-298.327	-2.534	1
GRID	2031	0	-41.500	-293.800	-4.750	0
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GRID	2034	0	-25.500	-293.800	-9.850	0
GRID	2037	0	-41.500	-308.500	-5.350	0
GRID	2038	0	-54.216	-310.784	-2.852	0
GRID	2039	0	-41.500	-308.500	-3.166	0
GRID	2040	0	-25.500	-308.500	-10.350	0
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GRID	2052	0	-120.000	-354.601	-1.763	0
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MAT1	606		6.825E6	4.400E6		
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PBEAM	11	2	1980.000	10100.000	3670.000	5250.
+11	NO	1.0		1000.000	3691.000	
+11A	0.	1.				
PBEAM	12	2	1980.000	1000.000	3691.000	5250.
+12	NO	1.0		9600.000	3700.000	
+12A	0.	1.				
PBEAM	13	2	1980.000	9600.000	3700.000	5250.
+13	NO	1.0		8750.000	3780.000	
+13A	0.	1.				
PBEAM	14	2	1980.000	8750.000	3780.000	5250.
+14	NO	1.0		8123.630	3590.000	
+14A	0.	1.				
PBEAM	15	2	1980.000	8123.630	3590.000	5250.
+15	NO	1.0		7200.000	3340.000	
+15A	0.	1.				
PBEAM	16	2	1980.000	7200.000	3340.000	5067.5
+16	NO	1.0		6425.000	1872.000	
+16A	0.	1.				
PBEAM	17	2	1980.000	6425.000	1872.000	4910.0
+17	NO	1.0		1980.000	6375.000	
+17A	0.	1.		.0000	1791.000	
PBEAM	18	2	1980.000	1980.000	6375.000	4725.0
+18	NO	1.0		1980.000	6200.000	
+18A	0.	1.		.0000	1470.000	
PBEAM	19	2	1980.000	1980.000	6200.000	4515.0
+19	NO	1.0		1980.000	6900.000	
+19A	0.	1.		.0000	1374.000	
PBEAM	20	2	1980.000	1980.000	6900.000	4375.5
+20	NO	1.0		1980.000	8250.000	
+20A	0.	1.		.0000	1167.000	
PBEAM	21	2	1980.000	1980.000	8250.000	4147.5
+21	NO	1.0		1980.000	8250.000	
+21A	0.	1.		.0000	960.000	
PBEAM	22	2	1.	8250.000	960.000	3885.
+22	NO	1.0		8250.000		
+22A	0.	1.				
PBEAM	31	2	200.000	9999.0	99999.0	.01
+31	NO	1.0		197.000		
PBEAM	32	2	200.000	9999.0	99999.0	.01
+32	NO	1.0		200.000		
PBEAM	33	2	200.000	9999.0	99999.0	.01
+33	NO	1.0		207.000		
PBEAM	34	2	200.000	9999.0	99999.0	.01
+34	NO	1.0		215.000		
PBEAM	35	2	200.000	9999.0	99999.0	.01
+35	NO	1.0		219.000		
PBEAM	36	2	200.000	9999.0	99999.0	.01
+36	NO	1.0		222.000		
PBEAM	37	2	1980.000	9999.0	9999.0	.01
+37	NO	1.0		1188.000		
PBEAM	38	2	1.970	9999.0	251.45	.01
+38	NO	1.0		.950	49.35	
PBEAM	39	2	4.140	9999.0	323.80	
+39	NO	1.0		2.140	123.20	
PBEAM	40	2	4.140	9999.0	284.10	
+40	NO	1.0		2.180	140.90	
PBEAM	41	2	5.590	9999.0	376.60	
+41	NO	1.0		2.834	124.70	
PBEAM	42	2	3.942	9999.0	379.30	
+42	NO	1.0		2.088	112.40	
PBEAM	43	2	2.886	9999.0	350.15	
+43	NO	1.0		2.340	293.75	

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PBEAM	44	2	2.340	9999.0	293.75		+44
+44	NO	1.0	1.430		99.875		
PBEAM	45	2	1.430	9999.0	99.875	.001	+45
+45	NO	1.0	1.521		76.375		
PBEAM	46	2	2.250	9999.0	215.00	.001	+46
+46	NO	1.0	2.250		162.00		
PBEAM	47	2	2.250	9999.0	162.00		+47
+47	NO	1.0	1.875		133.00		
PBEAM	48	2	1.875	9999.0	133.00		+48
+48	NO	1.0	2.250		46.00		
PBEAM	49	2	1.256	1.	41.26	.001	+49
+49	NO	1.0	1.354		51.57		+49A
+49A	0.	1.		-1.188			
PBEAM	50	2	1.354	1.	51.57		+50
+50	NO	1.0	1.371		53.59		+50A
+50A	0.	1.		-0.0185			
PBEAM	51	2	1.371	1.	53.59		+51
+51	NO	1.0	1.371		53.59		+51A
+51A	0.	1.		.0000			
PBEAM	52	2	1.371	1.	53.59		+52
+52	NO	1.0	1.534		60.14		+52A
+52A	0.	1.		-0.0622			
PBEAM	53	2	1.534	1.	60.14	.001	+53
+53	NO	1.0	1.547		62.03		+53A
+53A	0.	1.		-0.0086			
PBEAM	54	2	.942	1.	37.54	.001	+54
+54	NO	1.0	1.449		76.22		+54A
+54A	0.	1.		-0.4242			
PBEAM	55	2	1089.000	1.	9999.00	.001	+55
+55	NO	1.0	1980.000		9999.00		+55A
+55A	0.	1.		.0000			
PBEAM	56	2	1980.000	1.	9999.00	.001	+56
+56	NO	1.0	1485.000		9999.00		+56A
+56A	0.	1.		.0000			
PBEAM	57	2	1.440	.001	.001	.001	+57
+57	NO	1.0	1.440				+57A
+57A	0.	1.		.0000			
PBEAM	141	2	2.380	1.	46.34	.001	+141
+141	NO	1.0	2.520		52.89		+141A
+141A	0.	1.		-0.0571			
PBEAM	142	2	2.520	1.	52.89	.001	+142
+142	NO	1.0	2.660		60.54		+142A
+142A	0.	1.		-0.0541			
PBEAM	143	2	2.660	1.	54.50	.001	+143
+143	NO	1.0	2.800		61.49		+143A
+143A	0.	1.		-0.0513			
PBEAM	144	2	2.800	1.	61.49	.001	+144
+144	NO	1.0	3.080		76.54		+144A
+144A	0.	1.		-0.0952			
PBEAM	145	2	3.080	1.	76.54	.001	+145
+145	NO	1.0	3.080		76.54		+145A
+145A	0.	1.		.0000			
PBEAM	146	2	.990	1.	44.68		

+171A	0.	1.		.0000					
PBEAM	172	2	1.230	1.	84.87	.001			
+172	NO	1.0	1.000		57.12				
+172A	0.	1.		.2063					
PBEAM	173	2	1.125	1.	41.92	.001			
+173	NO	1.0	1.188		46.53				
+173A	0.	1.		-.0541					
PBEAM	174	2	.750	1.	12.63	.001			
+174	NO	1.0	1.063		23.78				
+174A	0.	1.		-.3448					
PBEAM	175	2	1059.3001		9999.00	.001			
+175	NO	1.0	841.500		9999.00				
+175A	0.	1.		.0000					
PBEAM	176	2	75.000	1.	2.98	.001			
+176	NO	1.0	79.000		12.10				
+176A	0.	1.		.0000					
PBEAM	177	2	79.000	1.	12.10	.001			
+177	NO	1.0	82.000		29.71				
+177A	0.	1.		.0000					
PBEAM	178	2	82.000	1.	29.71	.001			
+178	NO	1.0	85.000		29.71				
+178A	0.	1.		.0000					
PBEAM	179	2	85.000	9999.0	46.06	.001			
+179	NO	1.0	90.000						
PBEAM	180	2	90.000	9999.0	46.06	.001			
+180	NO	1.0	55.800		31.90				
PBEAM	181	2	990.000	1.	9999.00	.001			
+181	NO	1.0							
PBEAM	182	2	990.000	1.	9999.00	.001			
+182	NO	1.0							
PBEAM	1001	2	1.34778	1.	14.325				
+1001	NO	1.	1.32951		14.209				
+1001A	0.	1.		1.36-2					
PBEAM	1002	2	1.32951	1.	14.209				
+1002	NO	1.	1.23648		13.640				
+1002A	0.	1.		7.25-2					
PBEAM	1003	2	1.23648	1.	13.640				
+1003	NO	1.	1.09137		12.836				
+1003A	0.	1.		.125					
PBEAM	1004	2	1.09137	1.	12.836				
+1004	NO	1.	0.85176		11.727				
+1004A	0.	1.		.247					
PBEAM	1005	2	0.85176	1.	11.727				
+1005	NO	1.	0.57309		10.782				
+1005A	0.	1.		.391					
PBEAM	1007	2	0.5201	1.	4.137				
+1007	NO	1.	0.5704		4.188				
+1007A	0.	1.		-9.23-2					
PBEAM	1009	2	0.05068	1.	7.4				
+1009	NO	1.	0.05704						
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PBEAM	1010	2	0.68448	1.	11.387				
+1010	NO	1.	0.65988		10.584				
+1010A	0.	1.		3.66-2					
PBEAM	1011	2	0.65988	1.	3.834				
+1011	NO	1.	0.58224		3.781				
+1011A	0.	1.		.125					
PBEAM	1012	2	0.4852	1.	2.985				
+1012	NO	1.	0.3817		3.085				
+1012A	0.	1.		.239					
PBEAM	1013	2	0.3817	1.	4.113				
+1013	NO	1.	0.2527		3.779				
+1013A	0.	1.		.407					
PBEAM	1014	2	1.1795	1.	32.608				
+1014	NO	1.	1.24325		37.764				
+1014A	0.	1.		-5.26-2					
PBEAM	1015	2	1.24325	1.	35.291				
+1015	NO	1.	1.26225		36.787				
+1015A	0.	1.		-1.52-2					
PBEAM	1016	2	1.0098	1.	36.787				
+1016	NO	1.	0.897		28.514				
+1016A	0.	1.		.118					
PBEAM	1017	2	0.897	1.	28.514				
+1017	NO	1.	0.7106		17.378				
+1017A	0.	1.		.232					
PBEAM	1018	2	0.88825	1.	17.378				
+1018	NO	1.	0.569		7.448				
+1018A	0.	1.		.438					
PBEAM	1020	2	.174168	1.	2.924				
+1020	NO	1.	.192741		3.774				
+1020A	0.	1.		-1.01					
PBEAM	1022	2	.004037	1.	8.0				
+1022	NO	1.	.004701		3.				
+1022A	0.	1.		-1.52					
PBEAM	1023	2	.192741	1.	3.774				
+1023	NO	1.	.173225		1.931				
+1023A	0.	1.		.107					
PBEAM	1024	2	.173225	1.	1.931				
+1024	NO	1.	.137473		.991				
+1024A	0.	1.		.230					
PBEAM	1025	2	.137473	1.	.991				
+1025	NO	1.	.085198		4.751				
+1025A	0.	1.		.470					
PBEAM	1026	2	0.53326	1.	4.915				
+1026	NO	1.	0.56896		4.995				
+1026A	0.	1.		-6.48-2					
PBEAM	1027	2	0.97536	1.	4.995				
+1027	NO	1.	.93792		4.858				
+1027A	0.	1.		3.91-2					
PBEAM	1028	2	0.54712	1.	4.858				
+1028	NO	1.	0.43652		2.292				
+1028A	0.	1.		.225					
PBEAM	1029	2	0.12472	1.	2.292				
+1029	NO	1.	0.07392		.998				
+1029A	0.	1.		.511					
PBEAM	1031	2	.602006	1.	12.135				
+1031	NO	1.	.638206		13.539				
+1031A	0.	1.		-5.84-2					
PBEAM	1033	2	0.0327	1.	5.4				
+1033	NO	1.	0.03526		0.529				
+1033A	0.	1.		-7.53-2					
PBEAM	1034	2	.461906	1.	13.539				
+1034	NO	1.	.371385		8.407				
+1034A	0.	1.		.217					

PBEAM	1035	2	0.1134	1.	.241				+1035
+1035	NO	1.	0.0864		.140				+1035A
+1035A	0.	1.		.270					
PBEAM	1036	2	.371385	1.	7.726				+1036
+1036	NO	1.	.208421		2.466				+1036A
+1036A	0.	1.		.562					
PBEAM	1037	2	0.0864	1.	.140				+1037
+1037	NO	1.	0.06364		.0759				+1037A
+1037A	0.	1.		.303					
PBEAM	1038	2	0.54612	1.	5.551				+1038
+1038	NO	1.	0.58212		5.807				+1038A
+1038A	0.	1.		-6.38-2					
PBEAM	1039	2	0.19404	1.	4.814				+1039
+1039	NO	1.	0.15936		2.212				+1039A
+1039A	0.	1.		.196					
PBEAM	1040	2	0.15936	1.	2.212				+1040
+1040	NO	1.	0.1296		.140				+1040A
+1040A	0.	1.		.206					
PBEAM	1041	2	0.216	1.	.233				+1041
+1041	NO	1.	0.1411		.0995				+1041A
+1041A	0.	1.		.419					
PBEAM	1043	2	.1148	1.	.239				+1043
+1043	NO	1.	.118531		.255				+1043A
+1043A	0.	1.		-3.20-2					
PBEAM	1045	2	0.02716	1.	3.2				+1045
+1045	NO	1.	0.02891		0.119				+1045A
+1045A	0.	1.		-6.24-2					
PBEAM	1046	2	.118531	1.	.255				+1046
+1046	NO	1.	.103033		.193				+1046A
+1046A	0.	1.		.140					
PBEAM	1047	2	0.02568	1.	0.001				+1047
+1047	NO	1.	0.02513						+1047A
+1047A	0.	1.		2.16-2					
PBEAM	1048	2	.103033	1.	.193				+1048
+1048	NO	1.	.082328		.123				+1048A
+1048A	0.	1.		.223					
PBEAM	1049	2	.082328	1.	.637				+1049
+1049	NO	1.	0.05289		.953				+1049A
+1049A	0.	1.		.435					
PBEAM	1050	2	12.9	1.	.952				+1050
+1050	NO	1.	2.9		.15				+1050A
+1050A	0.	1.		1.266					
PBEAM	1051	2	0.41616	1.	4.768				+1051
+1051	NO	1.	0.39888		4.214				+1051A
+1051A	0.	1.		4.24-2					
PBEAM	1052	2	0.28808	1.	3.968				+1052
+1052	NO	1.	0.22399		2.323				+1052A
+1052A	0.	1.		.250					
PBEAM	1053	2	0.22399	1.	2.323				+1053
+1053	NO	1.	0.13195		.077				+1053A
+1053A	0.	1.		.517					
PBEAM	1054	2	10.15	1.	1.104				+1054
+1054	NO	1.	2.3		.15				+1054A
+1054A	0.	1.		1.261					
PBEAM	1056	2	0.0772	1.	.112				+1056
+1056	NO	1.	.07868		.116				+1056A
+1056A	0.	1.		-1.90-2					
PBEAM	1057	2	0.07868	1.	.116				+1057
+1057	NO	1.	0.06116		.0701				+1057A
+1057A	0.	1.		.251					
PBEAM	1058	2	0.06116	1.	.587				+1058
+1058	NO	1.	.0332		.173				+1058A
+1058A	0.	1.		.593					
PBEAM	1059	2	8.3	1.	.173				+1059
+1059	NO	1.	1.8		.15				+1059A
+1059A	0.	1.		1.287					
PBEAM	1060	2	0.6004	1.	1.874				+1060
+1060	NO	1.	0.513		1.073				+1060A
+1060A	0.	1.		.157					
PBEAM	1061	2	0.5						

PBEAM	1084	2	0.9402	1.	2.762	+1084	1122	2	0.23987	1.	.388	+1122
+1084	NO	1.	0.8128		2.065	+1084A	+1122	NO	1.	0.2193	.324	+1122A
+1084A	O.	1.					+1122A	O.	1.	8.96-2		
PBEAM	1085	2	0.48769	1.	2.242	+1085	PBEAM	1123	2	2.193	1.	0.577
+1085	NO	1.	0.39912		2.251	+1085A	+1123	NO	1.	1.7255	0.319	+1123
+1085A	O.	1.					+1123A	O.	1.			+1123A
PBEAM	1086	2	0.73172	1.	4.425	+1086	PBEAM	1124	2	1.7255	.1	0.319
+1086	NO	1.	0.7194		4.277	+1086A	+1124	NO	1.	1.411	0.186	+1124A
+1086A	O.	1.					+1124A	O.	1.			+1124A
PBEAM	1087	2	0.7194	1.	4.277	+1087	PBEAM	1125	2	1.411	1.	0.186
+1087	NO	1.	0.66748		3.682	+1087A	+1125	NO	1.	1.122	0.37	+1125A
+1087A	O.	1.					+1125A	O.	1.			+1125A
PBEAM	1088	2	0.48544	1.	3.682	+1088	PBEAM	1126	2	0.290	1.	.15
+1088	NO	1.	0.448		3.136	+1088A	+1126	NO	1.	0.230		+1126
+1088A	O.	1.					+1126A	O.	1.			+1126A
PBEAM	1089	2	0.616	1.	3.136	+1089	PBEAM	1127	2	0.230	1.	.15
+1089	NO	1.	0.59752		2.951	+1089A	+1127	NO	1.	0.180		+1127
+1089A	O.	1.					+1127A	O.	1.			+1127A
PBEAM	1090	2	0.59752	1.	3.319	+1090	PBEAM	1128	2	0.180	1.	.15
+1090	NO	1.	0.56496		2.968	+1090A	+1128	NO	1.	0.150		+1128
+1090A	O.	1.					+1128A	O.	1.			+1128A
PBEAM	1091	2	.964044	1.	26.163	+1091	PBEAM	1131	2	24.900	1.	2.334
+1091	NO	1.	.900046		33.946	+1091A	+1131	NO	1.0	41.600	4.497	+1131A
+1091A	O.	1.					+1131A	O.	1.			+1131A
PBEAM	1092	2	.80058	1.	8.240	+1092	PBEAM	1132	2	22.300	1.	1.258
+1092	NO	1.	.740025		7.040	+1092A	+1132	NO	1.0	43.800	6.091	+1132A
+1092A	O.	1.					+1132A	O.	1.			+1132A
PBEAM	1093	2	0.9867	1.	3.017	+1093	PBEAM	1133	2	43.800	1.	6.091
+1093	NO	1.	0.9295		2.678	+1093A	+1133	NO	1.0	46.400	8.843	+1133A
+1093A	O.	1.					+1133A	O.	1.			+1133A
PBEAM	1094	2	0.7605	1.	2.231	+1094	PBEAM	1134	2	46.4	100.	13.5
+1094	NO	1.	0.70344		1.909	+1094A	+1134	NO	1.	50.68		+1134A
+1094A	O.	1.					+1134A	O.	1.			+1134A
PBEAM	1095	2	0.62528	1.	2.245	+1095	PBEAM	1135	2	20.300	1.	1.601
+1095	NO	1.	0.56416		5.554	+1095A	+1135	NO	1.0	39.600	5.214	+1135A
+1095A	O.	1.					+1135A	O.	1.			+1135A
PBEAM	1096	2	1.12832	1.	3.720	+1096	PBEAM	1136	2	17.900	1.	1.469
+1096	NO	1.	1.03488		3.138	+1096A	+1136	NO	1.0	35.300	4.849	+1136A
+1096A	O.	1.					+1136A	O.	1.			+1136A
PBEAM	1097	2	0.58212	1.	.9936	+1097	PBEAM	1137	2	35.300	1.	4.849
+1097	NO	1.	0.52038		.794	+1097A	+1137	NO	1.0	39.910	7.360	+1137A
+1097A	O.	1.					+1137A	O.	1.			+1137A
PBEAM	1098	2	0.46256	1.	.878	+1098	PBEAM	1138	2	39.91	100.	10.5
+1098	NO	1.	0.41088		.692	+1098A	+1138	NO	1.	40.37		+1138A
+1098A	O.	1.					+1138A	O.	1.			+1138A
PBEAM	1099	2	0.56496	1.	2.968	+1099	PBEAM	1139	2	15.900	1.	1.286
+1099	NO	1.	0.50864		3.405	+1099A	+1139	NO	1.0	31.800	4.283	+1139A
+1099A	O.	1.					+1139A	O.	1.			+1139A
PBEAM	1100	2	0.32368	1.	2.951	+1100	PBEAM	1140	2	14.000	1.	.836
+1100	NO	1.	0.2702		1.360	+1100A	+1140	NO	1.0	28.200	2.827	+1140A
+1100A	O.	1.					+1140A	O.	1.			+1140A
PBEAM	1101	2	0.2895	1.	1.434	+1101	PBEAM	1141	2	28.200	1.	2.827
+1101	NO	1.	0.237		1.561	+1101A	+1141	NO	1.0	32.160	4.634	+1141A
+1101A	O.	1.					+1141A	O.	1.			+1141A
PBEAM	1102	2	.803494	1.	19.105	+1102	PBEAM	1142	2	32.16	100.	7.94
+1102	NO	1.	.756148		18.318	+1102A	+1142	NO	1.	32.70		+1142A
+1102A	O.	1.					+1142A	O.	1.			+1142A
PBEAM	1103	2	.868368	1.	3.7	+1103	PBEAM	1143	2	12.800	1.	.537
+1103	NO	1.	.808308		3.656	+1103A	+1143	NO	1.0	26.050	1.860	+1143A
+1103A	O.	1.					+1143A	O.	1.			+1143A
PBEAM	1104	2	0.56848	1.	7.616	+1104	PBEAM	1144	2	11.190	1.	.541
+1104	NO	1.	0.53648		2.977	+1104A	+1144	NO	1.0	23.000	1.894	+1144A
+1104A	O.	1.					+1144A	O.	1.			+1144A
PBEAM	1105	2	0.53648	1.	1.985	+1105	PBEAM	1145	2	23.000	1.	1.894
+1105	NO	1.	0.49888		2.015	+1105A	+1145	NO	1.0	25.560	3.414	+1145A
+1105A	O.	1.					+1145A	O.	1.			+1145A
PBEAM	1106	2	0.49888	1.	2.217	+1106	PBEAM	1146	2	25.56	100.	6.5
+1106	NO	1.	0.4536		2.014	+1106A	+1146	NO	1.	27.16		+1146A
+1106A	O.	1.					+1146A	O.	1.			+1146A
PBEAM	1107	2	0.70875	1.	2.009	+1107	PBEAM	1147	2	9.060	1.	.492
+1107	NO	1.	0.664		1.764	+1107A	+1147	NO	1.0	19.800	1.700	+1147A
+1107A	O.	1.					+1147A	O.	1.			+1147A
PBEAM	1108	2	0.3984	1.	.670	+1108	PBEAM	1148	2	7.640	1.	.210
+1108	NO	1.	0.37695		.600	+1108A	+1148	NO	1.0	17.500	.929	+1148A
+1108A	O.	1.					+1148A	O.	1.			+1148A
PBEAM	1109	2	0.37695	1.	.600	+1109	PBEAM	1149	2	17.500	1.	.929
+1109	NO	1.	0.3324		1.367	+1109A	+1149	NO	1.0	18.620	1.942	+1149A
+1109A	O.	1.					+1149A	O.	1.			+1149A
PBEAM	1110	2	0.35456	1.	1.367	+1110	PBEAM	1150	2	18.62	100.	4.32
+1110	NO	1.	0.31472		.368	+1110A	+1150	NO	1.	19.3		+1150A
+1110A	O.	1.					+1150A	O.	1.			+1150A
PBEAM	1111	2	0.15736	1.	.242	+1111	PBEAM	1151	2	7.100	1.	.042
+1111	NO	1.	0.1264		1.156	+1111A	+1151	NO	1.0	16.900	.269	+1151A
+1111A	O.	1.					+1151A	O.	1.			+1151A
PBEAM	1112	2	0.1728	1.	.303	+1112	PBEAM	1152	2	22.300	1.	1.150
+1112	NO	1.	0.16064		.262	+1112A	+1152	NO	1.0	24.900	1.440	+1152A
+1112A	O.	1.					+1152A	O.	1.			+1152A
PBEAM	1113	2	0.16064	1.	.222	+1113	PBEAM	1153	2	20.300	1.	.870
+1113	NO	1.	0.13784		.163	+1113A	+1153	NO	1.0	22.300	1.150	+1153A
+1113A	O.	1.					+1153A	O.	1.			+1153A
PBEAM	1114	2	0.13784	1.	.148	+1114	PBEAM	1154	2	17.900	1.	.630
+1114	NO	1.	0.12232		.117	+1114A	+1154	NO	1.0	20.300	.870	+1154A
+1114A	O.	1.					+1154A	O.	1.			+1154A
PBEAM	1115	2	0.12232	1.	.117	+1115	PBEAM	1155	2	15.900	1.	.470
+1115	NO	1.	0.108		.991	+1115A	+1155	NO	1.0	17.900	.630	+1155A
+1115A	O.	1.					+1155A	O.	1.			+1155A
PBEAM	1116	2	.337714	1.	19.909	+1116	PBEAM	1156	2	14.000	1.	.340
+1116	NO	1.	.312716		19.868	+1116A	+1156	NO	1.0	15.900	.470	+1156A
+1116A	O.	1.					+1156A	O.	1.			+1156A
PBEAM	1117	2	0.85918	1.	3.590	+1117	PBEAM	1157	2	12.800	1.	.260
+1117	NO	1.	0.77394		3.626	+1117A	+1157	NO	1.0	14.000	.340	+1157A
+1117A	O.	1.					+1157A	O.	1.			+1157A
PBEAM	1118	2	0.54624	1.	6.20	+1118	PBEAM	1158	2	11.190	1.	.280
+1118	NO	1.	0.49872		2.937	+1118A	+1158	NO	1.0	12.800	.260	+1158A
+1118A	O.	1.					+1158A	O.	1.			+1158A
PBEAM	1119	2	0.39482	1.	1.371	+1119	PBEAM	1159	2	9.060	1.	.260
+1119	NO	1.	0.35112		1.197	+1119A	+1159	NO	1.0	11.190	.280	+1159A
+1119A	O.	1.					+1159A	O.	1.			+1159A
PBEAM	1120	2	0.31416	1.	1.796	+1120	PBEAM	1160	2	7.640	1.	.170
+1120	NO	1.	0.27047		1.622	+1120A	+1160	NO	1.0	9.060	.260	+1160A
+1120A	O.	1.					+1160A	O.	1.			+1160A
PBEAM	1121	2	0.36593	1.	.570	+1121	PBEAM	1161	2	7.100	1.	.120
+1121	NO	1.	0.32453		.448	+1121A	+1161	NO	1.0	7.640	.170	+1161A
+1121A	O.	1.					+1161A	O.	1.			+1161A

PBEAM	1263	2	4.750	1.	.00047	.900	+1263	PBEAM	2055	2	105.994	1.	.914	.001	+2055
+1263	NO	1.0	5.250		.00068		+1263A	+2055	NO	1.	92.900	1.	.632		+2056
+1263A	0.	1.		-.1000				PBEAM	2056	2	92.900	1.	.632	.001	
PBEAM	1264	2	4.260	1.	.00035	.700	+1264	+2056	NO	1.	79.720	1.	.350		+2057
+1264	NO	1.0	4.750		.00047		+1264A	PBEAM	2057	2	79.720	1.	.310	.001	
+1264A	0.	1.		-.1088				+2057	NO	1.	64.600	1.	.204		+2058
PBEAM	1265	2	3.950	1.	.00023	.400	+1265	PBEAM	2058	2	64.600	1.	.204	.001	
+1265	NO	1.0	4.260		.00035		+1265A	+2058	NO	1.	49.451	1.	.099		+3026P
+1265A	0.	1.		-.0755				PBEAM	3026	2	1.896	1000.	10.	.001	+3026PA
PBEAM	1266	2	3.640	1.	.00017	.300	+1266	+3026P	NO	1.	4.92				
+1266	NO	1.0	3.950		.00023		+1266A	+3026PA	0.	1.					
+1266A	0.	1.		-.0817				PBEAM	3027	2	0.3	1000.	10.	.001	+3027P
PBEAM	1267	2	3.330	1.	.00011	.150	+1267	+3027P	NO	1.	0.123				+3027PA
+1267	NO	1.0	3.640		.00017		+1267A	+3027PA	0.	1.		0.837			
+1267A	0.	1.		-.0890				PBEAM	3028	2	22.	1000.	10.	.001	+3028P
PBEAM	1268	2	2.990	1.	.00008	.075	+1268	+3028P	NO	1.	41.				+3028PA
+1268	NO	1.0	3.330		.00011		+1268A	+3028PA	0.	1.		-0.603			
+1268A	0.	1.		-.1076				PBEAM	3029	2	22.	1000.	10.	.001	+3029P
PBEAM	2001	2	2038.9591.		2.060	.001	+2001	+3029P	NO	1.					
+2001	NO	1.	3806.7001.		19.530			PBEAM	3030	2	41.	1000.	10.	.001	+3030P
PBEAM	2002	2	3806.7001.		19.530	.001	+2002	+3030P	NO	1.					
+2002	NO	1.	5574.4201.		37.000			PBEAM	3031	2	41.	1000.	10.	.001	+3031P
PBEAM	2003	2	5574.4201.		37.000	.001	+2003	+3031P	NO	1.					+3032P
+2003	NO	1.	3618.9001.		18.660			PBEAM	3032	2	41.	1000.	10.	0.	
PBEAM	2004	2	3618.9001.		18.660	.001	+2004	+3032P	NO	1.					
+2004	NO	1.	1663.3351.		.320			PBEAM	3081	2	23.11	999.	.01	.01	+3081P
PBEAM	2005	2	1429.5691.		1.290	.001	+2005	+3081P	NO	1.	100.				+3081PA
+2005	NO	1.	3214.8001.		10.645			+3081PA			-1.249				
PBEAM	2006	2	3214.8001.		10.645	.001	+2006	PBEAM	3082	2	100.	999.	.01	.01	+3082P
+2006	NO	1.	4999.9951.		20.000			+3082P	NO	1.	22.11				+3082PA
PBEAM	2007	2	4999.9951.		20.000	.001	+2007	+3082PA			1.276				
+2007	NO	1.	3331.6651.		11.600			PBEAM	3083	2	100.	999.	.01	.01	+3083P
PBEAM	2008	2	3331.6651.		11.600	.001	+2008	+3083P	NO	1.					+3083PA
+2008	NO	1.	1663.3351.		.320			+3083PA	1.	.001					
PBEAM	2009	2	1117.8811.		.770	.001	+2009	PBEAM	3085	2	100.	999.	.01	.01	+3085P
+2009	NO	1.	2357.6401.		.485			+3085P	NO	1.					+3085PA
PBEAM	2010	2	2357.6401.		.485	.001	+2010	+3085PA	1.	.001					
+2010	NO	1.	3597.3991.		.200			PBEAM	3087	2	22.	.001	26.89	.001	+3087P
PBEAM	2011	2	3597.3991.		.200	.001	+2011	+3087P	NO	1.					+3087PA
+2011	NO	1.	2467.5301.		.650			+3087PA	.001	1.					
PBEAM	2012	2	2467.5301.		.650	.001	+2012	PBEAM	3088	2	22.	.001	999.	.001	+3088P
+2012	NO	1.	1337.6611.		1.100			+3088P	NO	1.					+3088PA
PBEAM	2013	2	859.140	1.	.294	.001	+2013	+3088PA	.001	1.					
+2013	NO	1.	1864.8001.		.247			PBEAM	3089	2	22.	.001	10.	.001	+3089P
PBEAM	2014	2	1864.8001.		.247	.001	+2014	+3089P	NO	1.					+3089PA
+2014	NO	1.	2870.5271.		.200			+3089PA	.001	1.					
PBEAM	2015	2	2870.5271.		.200	.001	+2015	PBEAM	3090	2	3.3	.001	5.88	4.5	+3090P
+2015	NO	1.	1965.2331.		.470			+3090P	NO	1.	.726				+3090PA
PBEAM	2016	2	1965.2331.		.470	.001	+2016	+3090PA	.001	1.	1.279				
+2016	NO	1.	1059.9391.		.740			PBEAM	3091	2	.726	.001	5.88	4.5	+3091P
PBEAM	2017	2	617.482	1.	.108	.001	+2017	+3091P	NO	1.					+3091PA
+2017	NO	1.	1398.2001.		.104			+3091PA	.001	1.					
PBEAM	2018	2	1398.2001.		.104	.001	+2018	PBEAM	3092	2	.726	.001	16.17	15.	+3092P
+2018	NO	1.	2178.8191.		.100			+3092P	NO	1.					+3092PA
PBEAM	2019	2	2178.8191.		.100	.001	+2019	+3092PA	.001	1.					
+2019	NO	1.	1488.0001.		.120			PBEAM	3093	2	.726	.001	5.88	4.5	+3093P
PBEAM	2020	2	1488.0001.		.120	.001	+2020	+3093P	NO	1.	3.3				+3093PA
+2020	NO	1.	797.200	1.	.140			+3093PA	.001	1.		-1.279			
PBEAM	2021	2	454.845	1.	.100	.001	+2021	PBEAM	3094	2	100.	10.21	.001	.01	+3094P
+2021	NO	1.	832.800	1.	.110			+3094P	NO	1.					+3094PA
PBEAM	2022	2	832.800	1.	.110	.001	+2022	+3094PA	1.	.001					
+2022	NO	1.	1210.7881.		.120			PBEAM	3095	2	100.	80.	.001	.01	+3095P
PBEAM	2023	2	1210.7881.		.120	.001	+2023	+3095P	NO	1.					+3095PA
+2023	NO	1.	852.600	1.	.126			+3095PA	1.	.001					
PBEAM	2024	2	852.600	1.	.126	.001	+2024	PBEAM	3096	2	100.	10.21	.001	.01	+3096P
+2024	NO	1.	494.505	1.	.131			+3096P	NO	1.					+3096PA
PBEAM	2031	2	203.896	1.	41.200	.001	+2031	+3096PA	1.	.001					
+2031	NO	1.	173.400	1.	22.970			PBEAM	3097	2	100.	333.	.1	.01	+3097P
PBEAM	2032	2	173.400	1.	22.970	.001	+2032	+3097P	NO	1.					
+2032	NO	1.	142.957	1.	1.740			PBEAM	3098	2	22.	333.	.001	.01	+3098P
PBEAM	2033	2	142.957	1.	1.740	.001	+2033	+3098P	NO	1.					
+2033	NO	1.	127.400	1.	1.339			PBEAM	3099	2	100.	333.	.1	.01	+3099P
PBEAM	2034	2	127.400	1.	1.339	.001	+2034	+3099P	NO	1.					
+2034	NO	1.	111.788	1.	.937			PBEAM	3100	2	100.	999.	999.	20.	+3100P
PBEAM	2035	2	111.788	1.	.937	.001	+2035	+3100P	NO	1.					
+2035	NO	1.	98.900	1.	.714			PBEAM	3391	2	60.	99999.	99999.	.01	+3391P
PBEAM	2036	2	98.900	1.	.714	.001	+2036	+3391P	NO	1.					
+2036	NO	1.	85.914	1.	.490			PBEAM	3405	2	60.	99999.	99999.	.01	+3405P
PBEAM	2037	2	85.914	1.	.490	.001	+2037	+3405P	NO	1.					
+2037	NO	1.	73.800	1.	.395			PBEAM	3407	2	60.	99999.	30.11	.01	+3407P
PBEAM	2038	2	73.800	1.	.395	.001	+2038	+3407P	NO	1.					
+2038	NO	1.	61.748	1.	.300			PBEAM	3409	2	60.	99999.	99999.	249750.	+3409P
PBEAM	2039	2	61.748	1.	.300	.001	+2039	+3409P	NO	1.					
+2039	NO	1.	53.600	1.	.205			PBEAM	5002	2	.920	736.000	606.050	640.	+5002
PBEAM	2040	2	53.600	1.	.205	.001	+2040	+5002	NO	1.0		896.000	655.500		+5002A
+2040	NO	1.	45.484	1.	.110			+5002A	0.	1.					
PBEAM	2041	2	557.442	1.	61.000	.001	+2041	PBEAM	5051	2	4.140	6240.0003625.000		5250.	+5051
+2041	NO	1.	528.700	1.	34.500			+5051	NO	1.0		8000.0004172.000			+5051A
PBEAM	2042	2	528.700	1.	34.500	.001	+2042	+5051A	0.	1.					
+2042	NO	1.	500.000	1.	8.000			PBEAM	5052	2	4.140	8000.0004172.000		5250.	+5052
PBEAM	2043	2	500.000	1.	2.100	.001	+2043	+5052	NO	1.0		8000.0004245.000			+5052A
+2043	NO	1.	429.900	1.	1.750			+5052A	0.	1.					
PBEAM	2044	2	429.900	1.	1.750	.001	+2044	PBEAM	5053	2	4.140	8000.0004245.000		5250.	+5053
+2044	NO	1.	359.740	1.	1.400			+5053	NO	1.0		8000.0004263.000			+5053A
PBEAM	2045	2	359.740	1.	1.400	.001	+2045	+5053A	0.	1.					
+2045	NO	1.	323.400	1.	1.300			PLOTTEL	25	283	407				
PBEAM	2046	2	323.400	1.	1.300	.001	+2046	PLOTTEL	26	281	409				
+2046	NO	1.	287.053	1.	1.200			PSHEAR	71	2	.0611				
PBEAM	2047	2	287.053	1.	1.200	.001	+2047	PSHEAR	72	2	.069325				
+2047	NO	1.	252.500	1.	.860			PSHEAR	73	2	.071675				
PBEAM	2048	2	252.500	1.	.860	.001	+2048	PSHEAR	74	2	.069325				
+2048	NO	1.	217.882	1.	.520			PSHEAR	75	2	.0611				
PBEAM	2049	2	217.882	1.	.520	.001	+2049	PSHEAR	76	2	.055812				
+2049	NO	1.	169.500	1.	.323			PSHEAR	201</						

PSHEAR	655	1	.042
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PSHEAR	657	1	.04275
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PSHEAR	659	1	.090
PSHEAR	660	1	.0635
PSHEAR	3105	2	.20942
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PSHELL	604	601	.378
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PSHELL	606	606	.247
PSHELL	607	606	.252
PSHELL	608	606	.341
PSHELL	609	606	.438
PSHELL	610	606	.410
PSHELL	611	606	.279
PSHELL	612	5	.252
PSHELL	613	5	.323
PSHELL	614	5	.384
PSHELL	615	5	.313
PSHELL	616	5	.234
PSHELL	617	5	.271
PSHELL	618	5	.275
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SPC1	3	156	36	42	50	437	59
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SPC1	3	156	163	164	153	154	155
SPC1	3	156	267	268	458	459	156
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SPC1	4	234	267	268	458	459	156
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SPC1	5	4	3022				
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SPC1	5	456	251	256	261	262	266
SPC1	5	456	1001	1002	1003	1004	1005
SPC1	5	456	1007	1008	1010	1012	1014
SPC1	5	456	1018	1173	1174	1175	1176
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SPC1	5	456	1029	1030	1032	1033	1038
SPC1	5	456	1031	1034	1037	1040	1045
SPC1	5	456	1044	1046	1047	1051	1052
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SPC1	5	456	1134	1135	1136	1137	1138
SPC1	5	456	1140	1141	1142		1139
SPC1	5	456	1143				
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SPC1	5	456	1181	THRU	1193		
SPC1	5	456	1233	2233			
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SPC1	5	456	1251	THRU	1266		
SPC1	5	456	1292	1293	1464	1465	1466
SPC1	5	456	1501	THRU	1526		1467
SPC1	5	456	2001	2002	2003	2004	2005
SPC1	5	456	2007	2008	2010	2012	2014
SPC1	5	456	2018	2173	2174	2175	2016
SPC1	5	456	2019	THRU	2027	2176	2177
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SPC1	5	456	2079	2114	2275	2276	2078
SPC1	5	456	2081	2085	2086	2087	2080
SPC1	5	456	2094	2114	2121		2280
SPC1	5	456	2096	2097	2098	2099	2088
SPC1	5	456	2102	2103	2104	2105	2100
SPC1	5	456	2108	2109	2110	2111	2106
SPC1	5	456	2125	2126	2127	2112	2107
SPC1	5	456	2128	2129	2130	2131	2113
SPC1	5	456	2134	2135	2136	2137	2132
SPC1	5	456	2140	2141	2142	2138	2133
SPC1	5	456	2143				2139
SPC1	5	456	2178	2179	2180	2194	
SPC1	5	456	2181	THRU	2193		
SPC1	5	456	2242	2243	2244	2245	
SPC1	5	456	2251	THRU	2266		
SPC1	5	456	2292	2293	2464	2465	2466
SPC1	5	456	2501	THRU	2526	2467	
SPC1	5	456	3063	3064	3065	3066	
SPC1	5	456	3067	3068	3069	3070	
SPC1	5	123456	701	702	703		
SPCADD	1	3	5				
SPCADD	2	4	5				
SUPORT	42	156					
ENDDATA							

Appendix C. **Structural Finite Element Data for Nontypical LCO Case**

ID LMTAS BLOCK 40 F-16 FLUTTER FEM NONTYPICAL LCO CASE

SOL 103

TIME 20

\$

CEND

\$

TITLE=F-16 1/2 AIRPLANE FINITE ELEMENT MODEL FOR FLUTTER ANALYSIS

SUBTI=ANTI-SYMMETRIC CENTERLINE BOUNDARY CONDITIONS // FULL XWING FUEL

LABEL=CONFIG 5 = MA41

DISP=ALL

ECHO=SORT

\$ DMIG VERTICAL TAIL STIFFNESS MATRIX

K2GG=VTAIL

\$ EIGENVALUE EXTRACTION

METHOD=1

\$ SYMMETRIC B.C. / SPC=2 FOR ANTISYMMETRIC

SPC=2

\$

\$ SET 203022=GRIDS USED IN FLUTTER ANALYSIS.

\$ ADD GRIDS 801 THROUGH 814 FOR DYNAMIC RESPONSE.

\$

SET 203022= 2, 3, 4, 5, 6,

9, 11, 13, 15, 17,

19, 20, 21, 26, 29,

33, 39, 44, 47, 51,

52, 53, 56, 60, 61,

62, 64, 65, 68, 72,

73, 74, 75, 77, 78,

81, 85, 86, 87, 89,

90, 91, 92, 93, 95,

102, 103, 104, 105, 106,

107, 108, 109, 110, 111,

112, 113, 122, 123, 124,

128, 129, 130, 131, 132,

133, 3004, 3006, 3009

\$ AIM-9/16S200 OR 16S200 ON TIP

\$

\$ GENERATE BUT DO NOT PRINT-

\$ EIGENVECTORS FOR FLUTTER ANALYSIS

\$

\$ PRINT-

\$ A-SET EIGENVECTORS FOR INSPECTION

\$

OUTPUT(PLOT)

CSCALE=1.8

PAPER SIZE=26. BY 20.

\$

\$ SET 10=ELEMENTS USED IN MODE PLOTS

\$

\$ FUSELAGE CENTERLINE

SET 10= 1 THRU 26,

\$ WING BOX

1001 THRU 1005,

1007,1010 THRU 1013,

1020,1023 THRU 1025,

1031,1034,1036,1043,1045,

1046,1048 THRU 1054,

1056 THRU 1062,

1071 THRU 1074,

1078,1079,1080,

1086 THRU 1090,

1099,1100,1101,

1075,1076,1077,

1081 THRU 1085,

1091 THRU 1097,

1102 THRU 1111,

1116 THRU 1125,

1126,1127,1128,

\$ LEADING EDGE FLAP / 1258 ACTUATOR

1131 THRU 1134,

1136,1137,1138,

1140,1141,1142,

1144,1145,1146,

1148 THRU 1151,

1152 THRU 1171,

\$ FLAPERON

1181 THRU 1185,

1187 THRU 1189,

1190 THRU 1194,

1196 THRU 1203,

1205 THRU 1207,

1209 THRU 1220,

1231 THRU 1238,

1251 THRU 1258,

1261 THRU 1268,

\$ HORIZONTAL TAIL

2001 THRU 2058,

\$ VERTICAL TAIL

2401 THRU 2460,

\$ 16S200 // STATION 1,9

3003 THRU 3009,

\$ AIM-9L // STATION 1,9

3014,3015

\$

\$ MAXIMUM DEFORMATION 35.

AXES MX,MY,Z

VIEW 60.0,30.,0.

FIND SCALE ORIGIN 10 SET 10

PLOT MODAL DEFO 0 SET 10 ORIGIN 10

\$

BEGIN BULK

ASET 3500 123456

ASET 3501 123456

ASET1	1	163	153	154	155	156	71	286
ASET1	1	267						
ASET1	1	284	281					
ASET1	1	367	408	368	359	384		
ASET1	1	373	364	381	383			
ASET1	1	386	391	371	362	387	392	393
ASET1	1	389	369	360	385	390	370	361
ASET1	1	410						
ASET1	1	3080	3082	3085				
ASET1	1	3207	3210	3211	3213			
ASET1	2	3079	3083					
ASET1	2	3206	3212					
ASET1	3	6	17	5	15	4	13	3
ASET1	3	11	2	9				
ASET1	3	19	72	20	60	73	21	61
ASET1	3	39	47	56	68	81		
ASET1	3	74	51	62	75	26	52	64
ASET1	3	77	29	44	53	65	78	33
ASET1	3	85	86	87	88			
ASET1	3	90	103	109	89	102	108	
ASET1	3	95	107	113	93	106	112	124
ASET1	3	130	133	92	105	111	123	129
ASET1	3	132	91	104	110	122	128	131
ASET1	3	233	3					
ASET1	3	251	THRU	266				
ASET1	3	3002	3004	3006	3009			
ASET1	3	3076	3080	3081	3085			
ASET1	3	3204	3210	3211	3213			
ASET1	4	3204	3211					
ASET1	5	153	154	155	156	71	286	284
ASET1	5	410						
ASET1	5	459						
ASET1	5	3211						
ASET1	6	437	281	410				
ASET1	6	458						
ASET1	6	3207	3211					
ASET1	123456	3088						
CBAR	27	27	284	410	1.	1.	0.	
CBAR	2401	2401	407	367	0.	1.	1.	
CBAR	2402	2402	367	368	0.	1.	1.	
CBAR	2403	2403	368	369	0.	1.	1.	
CBAR	2404	2404	369	370	0.	1.	1.	
CBAR	2405	2405	370	371	0.	1.	1.	
CBAR	2406	2406	371	372	0.	1.	1.	
CBAR	2407	2407	372	373	0.	1.	1.	
CBAR	2408	2408	373	374	0.	1.	1.	
CBAR	2409	2409	374	375	0.	1.	1.	
CBAR	2410	2410	375	376	0.	1.	1.	
CBAR	2411	2411	376	377	0.	1.	1.	
CBAR	2412	2412	377	378	0.	1.	1.	
CBAR	2413	2413	378	379	0.	1.	1.	
CBAR	2414	2414	379	380	0.	1.	1.	
CBAR	2415	2415	380	381	0.	1.	1.	
CBAR	2416	2416	381	382	0.	1.	1.	
CBAR	2417	2417	382	383	0.	1.	1.	
CBAR	2418	2418	383	384	0.	1.	1.	
CBAR	2419	2419	384	385	0.	1.	1.	
CBAR	2420	2420	385	386	0.	1.	1.	
CBAR	2421	2421	386	387	0.	1.	1.	
CBAR	2422	2422	387	388	0.	1.	1.	
CBAR	2423	2423	388	389	0.	1.	1.	
CBAR	2424	2424	389	390	0.	1.	1.	
CBAR	2425	2425	390	391	0.	1.	1.	
CBAR	2426	2426	391	392	0.	1.	1.	
CBAR	2427	2427	392	393	0.	1.	1.	
CBAR	2428	2428	393	394	0.	1.	1.	
CBAR	2429	2429	394	395	0.	1.	1.	
CBAR	2430	2430	395	396	0.	1.	1.	
CBAR	2431	2431	396	397	0.	1.	1.	
CBAR	2432	2432	397	398	0.	1.	1.	
CBAR	2433	2433	398	399	0.	1.	1.	
CBAR	2434	2434	399	400	0.	1.	1.	
CBAR	2435	2435	400	401	0.	1.	1.	
CBAR	2436	2436	401	402	0.	1.	1.	
CBAR	2437	2437	402	403	0.	1.	1.	
CBAR	2438	2438	403	404	0.	1.	1.	
CBAR	2439	2439	404	405	0.	1.	1.	
CBAR	2440	2440	405	406	0.	1.	1.	
CBAR	2441	2441	406	407	0.	1.	1.	
CBAR	2442	2442	407	408	0.	1.	1.	
CBAR	2443	2443	408	409	0.	1.	1.	
CBAR	2444	2444	409	410	0.	1.	1.	
CBAR	2445	2445	410	411	0.	1.	1.	
CBAR	2446	2446	411	412	0.	1.	1.	
CBAR	2447	2447	412	413	0.	1.	1.	
CBAR	2448	2448	413	414	0.	1.	1.	
CBAR	2449	2449	414	415	0.	1.	1.	
CBAR	2450	2450	415	416	0.	1.	1.	
CBAR	2451	2451	416	417	0.	1.	1.	
CBAR	2452	2452	417	418	0.	1.	1.	
CBAR	2453	2453	418	419	0.	1.	1.	
CBAR	2454	2454	419	420	0.	1.	1.	
CBAR	2455	2455	420	421	0.	1.	1.	
CBAR	2456	2456	421	422	0.	1.	1.	
CBAR	2457	2457	422	423	0.	1.	1.	
CBAR	2458	2458	423	424	0.	1.	1.	
CBAR	2459	2459	424	425	0.	1.	1.	
CBAR	2460	2460	425	426	0.	1.	1.	
CBAR	3502	3502	3500	52	1.	1.	0.	
CBAR	3503	3502	3501	52	1.	1.	0.	
CBAR	1	1	163	164	1.	0.	0.	
CBAR	2	2	164	153	1.	0.	0.	
CBAR	3	3	267	154	1.	0.	0.	

CBEAM	1147	1147	173	177	1.	0.	0.
CBEAM	1148	1148	2	194	1.	0.	0.
CBEAM	1149	1149	194	9	1.	0.	0.
CBEAM	1150	1150	9	20	1.	0.	0.
+BM1150	5						
CBEAM	1151	1151	1	8	1.	0.	0.
CBEAM	1152	1152	6	7	1.	0.	0.
CBEAM	1153	1153	176	6	1.	0.	0.
CBEAM	1154	1154	5	176	1.	0.	0.
CBEAM	1155	1155	175	5	1.	0.	0.
CBEAM	1156	1156	4	175	1.	0.	0.
CBEAM	1157	1157	174	4	1.	0.	0.
CBEAM	1158	1158	3	174	1.	0.	0.
CBEAM	1159	1159	173	3	1.	0.	0.
CBEAM	1160	1160	2	173	1.	0.	0.
CBEAM	1161	1161	1	2	1.	0.	0.
CBEAM	1162	1162	16	18	1.	0.	0.
CBEAM	1163	1163	180	16	1.	0.	0.
CBEAM	1164	1164	14	180	1.	0.	0.
CBEAM	1165	1165	179	14	1.	0.	0.
CBEAM	1166	1166	12	179	1.	0.	0.
CBEAM	1167	1167	178	12	1.	0.	0.
CBEAM	1168	1168	10	178	1.	0.	0.
CBEAM	1169	1169	177	10	1.	0.	0.
CBEAM	1170	1170	194	177	1.	0.	0.
CBEAM	1171	1171	8	194	1.	0.	0.
CBEAM	1181	1181	81	95	1.	0.	0.
+BM1181	456						
CBEAM	1182	1182	95	142	1.	0.	0.
CBEAM	1183	1183	142	101	1.	0.	0.
CBEAM	1184	1184	101	107	1.	0.	0.
CBEAM	1185	1185	107	113	1.	0.	0.
CBEAM	1186	1186	93	141	1.	0.	0.
CBEAM	1187	1187	141	100	1.	0.	0.
CBEAM	1188	1188	100	106	1.	0.	0.
CBEAM	1189	1189	106	112	1.	0.	0.
CBEAM	1190	1190	186	124	1.	0.	0.
+BM1190	456						
CBEAM	1191	1191	124	140	1.	0.	0.
CBEAM	1192	1192	140	127	1.	0.	0.
CBEAM	1193	1193	127	130	1.	0.	0.
CBEAM	1194	1194	130	133	1.	0.	0.
CBEAM	1195	1195	92	139	1.	0.	0.
CBEAM	1196	1196	139	99	1.	0.	0.
CBEAM	1197	1197	99	105	1.	0.	0.
CBEAM	1198	1198	105	111	1.	0.	0.
CBEAM	1199	1199	191	123	1.	0.	0.
+BM1199	456						
CBEAM	1200	1200	123	138	1.	0.	0.
CBEAM	1201	1201	138	126	1.	0.	0.
CBEAM	1202	1202	126	129	1.	0.	0.
CBEAM	1203	1203	129	132	1.	0.	0.
CBEAM	1204	1204	91	137	1.	0.	0.
CBEAM	1205	1205	137	96	1.	0.	0.
CBEAM	1206	1206	96	104	1.	0.	0.
CBEAM	1207	1207	104	110	1.	0.	0.
CBEAM	1208	1208	122	136	1.	0.	0.
CBEAM	1209	1209	136	125	1.	0.	0.
CBEAM	1210	1210	125	128	1.	0.	0.
CBEAM	1211	1211	128	131	1.	0.	0.
CBEAM	1212	1212	76	90	1.	0.	0.
+BM1212	456						
CBEAM	1213	1213	90	135	1.	0.	0.
CBEAM	1214	1214	135	97	1.	0.	0.
CBEAM	1215	1215	97	103	1.	0.	0.
CBEAM	1216	1216	103	109	1.	0.	0.
CBEAM	1217	1217	89	134	1.	0.	0.
CBEAM	1218	1218	134	96	1.	0.	0.
CBEAM	1219	1219	96	102	1.	0.	0.
CBEAM	1220	1220	102	108	1.	0.	0.
CBEAM	1221	1221	141	142	1.	0.	0.
CBEAM	1222	1222	140	141	1.	0.	0.
CBEAM	1223	1223	139	140	1.	0.	0.
CBEAM	1224	1224	138	139	1.	0.	0.
CBEAM	1225	1225	137	138	1.	0.	0.
CBEAM	1226	1226	136	137	1.	0.	0.
CBEAM	1227	1227	135	136	1.	0.	0.
CBEAM	1228	1228	134	135	1.	0.	0.
CBEAM	1241	1241	100	101	1.	0.	0.
CBEAM	1242	1242	127	100	1.	0.	0.
CBEAM	1243	1243	99	127	1.	0.	0.
CBEAM	1244	1244	126	99	1.	0.	0.
CBEAM	1245	1245	98	126	1.	0.	0.
CBEAM	1246	1246	125	98	1.	0.	0.
CBEAM	1247	1247	97	125	1.	0.	0.
CBEAM	1248	1248	96	97	1.	0.	0.
CBEAM	1251	1251	106	107	1.	0.	0.
CBEAM	1252	1252	130	106	1.	0.	0.
CBEAM	1253	1253	105	130	1.	0.	0.
CBEAM	1254	1254	129	105	1.	0.	0.
CBEAM	1255	1255	104	129	1.	0.	0.
CBEAM	1256	1256	128	104	1.	0.	0.
CBEAM	1257	1257	103	128	1.	0.	0.
CBEAM	1258	1258	102	103	1.	0.	0.
CBEAM	1261	1261	112	113	1.	0.	0.
CBEAM	1262	1262	133	112	1.	0.	0.
CBEAM	1263	1263	111	133	1.	0.	0.
CBEAM	1264	1264	132	111	1.	0.	0.
CBEAM	1265	1265	110	132	1.	0.	0.
CBEAM	1266	1266	131	110	1.	0.	0.
CBEAM	1267	1267	109	131	1.	0.	0.
CBEAM	1268	1268	108	109	1.	0.	0.
CBEAM	2001	2001	251	506	1.	1.	0.
+BM2001	456						
CBEAM	2002	2002	506	233	1.	1.	0.
CBEAM	2003	2003	233	517	1.	1.	0.
CBEAM	2004	2004	517	262	1.	1.	0.
+BM2004	456						
CBEAM	2005	2005	252	507	1.	1.	0.
+BM2005	456						
CBEAM	2006	2006	507	257	1.	1.	0.
CBEAM	2007	2007	257	518	1.	1.	0.
CBEAM	2008	2008	518	262	1.	1.	0.
+BM2008	456						

+BM1150

+BM1181

+BM1190

+BM1199

+BM1212

+BM2001

+BM2004

+BM2005

+BM2008

CBEAM	2009	2009	253	508	1.	1.	0.
+BM2009	456						
CBEAM	2010	2010	508	258	1.	1.	0.
CBEAM	2011	2011	258	519	1.	1.	0.
CBEAM	2012	2012	519	263	1.	1.	0.
+BM2012	456						
CBEAM	2013	2013	254	509	1.	1.	0.
+BM2013	456						
CBEAM	2014	2014	509	259	1.	1.	0.
CBEAM	2015	2015	259	520	1.	1.	0.
CBEAM	2016	2016	520	264	1.	1.	0.
+BM2016	456						
CBEAM	2017	2017	255	510	1.	1.	0.
+BM2017	456						
CBEAM	2018	2018	510	260	1.	1.	0.
CBEAM	2019	2019	260	521	1.	1.	0.
CBEAM	2020	2020	521	265	1.	1.	0.
+BM2020	456						
CBEAM	2021	2021	256	511	1.	1.	0.
+BM2021	456						
CBEAM	2022	2022	511	261	1.	1.	0.
+BM2022	456						
CBEAM	2023	2023	261	522	1.	1.	0.
+BM2023	456						
CBEAM	2024	2024	522	266	1.	1.	0.
+BM2024	456						
CBEAM	2031	2031	251	501	1.	1.	0.
+BM2031	456						
CBEAM	2032	2032	501	252	1.	1.	0.
CBEAM	2033	2033	252	502	1.	1.	0.
CBEAM	2034	2034	502	253	1.	1.	0.
CBEAM	2035	2035	253	503	1.	1.	0.
CBEAM	2036	2036	503	254	1.	1.	0.
CBEAM	2037	2037	254	504	1.	1.	0.
CBEAM	2038	2038	504	255	1.	1.	0.
CBEAM	2039	2039	255	505	1.	1.	0.
CBEAM	2040	2040	505	256	1.	1.	0.
+BM2040	456						
CBEAM	2041	2041	233	512	1.	1.	0.
CBEAM	2042	2042	512	257	1.	1.	0.
CBEAM	2043	2043	257	513	1.	1.	0.
CBEAM	2044	2044	513	258	1.	1.	0.
CBEAM	2045	2045	258	514	1.	1.	0.
CBEAM	2046	2046	514	259	1.	1.	0.
CBEAM	2047	2047	259	515	1.	1.	0.
CBEAM	2048	2048	515	260	1.	1.	0.
CBEAM	2049	2049	260	516	1.	1.	0.
CBEAM	2050	2050	516	261	1.	1.	0.
+BM2050	456						
CBEAM	2051	2051	262	523	1.	1.	0.
+BM2051	456						
CBEAM	2052	2052	523	263	1.	1.	0.
CBEAM	2053	2053	263	524	1.	1.	0.
CBEAM	2054	2054	524	264	1.	1.	0.
CBEAM	2055	2055	264	525	1.	1.	0.
CBEAM	2056	2056	525	265	1.	1.	0.
CBEAM	2057	2057	265	526	1.	1.	0.
CBEAM	2058	2058	526	266	1.	1.	0.
+BM2058	456						
CBEAM	3001	3001	19	3007	0.	1.	0.
CBEAM	3002	3002	3001	3008	0.	1.	0.
CBEAM	3003	3003	3002	3003	1.	0.	0.
CBEAM	3004	3004	3003	3004	1.	0.	0.
CBEAM	3005	3005	3004	3005	1.	0.	0.
CBEAM	3006	3006	3005	3006	1.	0.	0.
CBEAM	3007	3007	3006	3007	1.	0.	0.
CBEAM	3008	3008	3007	3008	1.	0.	0.
CBEAM	3009	3009	3008	3009	1.	0.	0.
+3009	5						
CBEAM	3131	3131	21	3076	0.	0.	1.
+3131	56						
CBEAM	3132	3132	3076	61	0.	0.	1.
+3132	56						
CBEAM	3133	3133	3076	3079	0.	1.	0.
+3133	5						
CBEAM	3134	3133	3079	3083	0.	1.	0.
CBEAM	3135	3135	3082	3077	0.	1.	0.
CBEAM	3136	3136	3077	3078	0.	0.	1.
+3136	6						
CBEAM	3137	3137	3084	3078	0.	1.	0.
+3137	6						
CBEAM	3138	3138	3082	3083	0.	0.	1.
+3138	56						

+3396	456								
CBEAM	3397	3391	183	3199	0.	0.	1.		
+3397	456								
CBEAM	3398	3391	3199	46	0.	0.	1.		
+3398	456								
CBEAM	3399	3391	3198	3200	0.	0.	1.		
CBEAM	3400	3391	3200	3196	0.	0.	1.		
CBEAM	3401	3391	3199	3202	0.	0.	1.		
CBEAM	3402	3391	3202	3197	0.	0.	1.		
CBEAM	3403	3391	3200	3201	0.	0.	1.		
+3403	5								
CBEAM	3404	3391	3201	3202	0.	0.	1.		
+3404	5								
CBEAM	3405	3405	3203	3204	0.	0.	1.		
CBEAM	3406	3405	3204	3205	0.	0.	1.		
CBEAM	3407	3407	3204	3206	0.	1.	0.		
+3407	6								
CBEAM	3408	3407	3206	3207	0.	1.	0.		
CBEAM	3409	3409	3207	3208	0.	0.	1.		
CBEAM	3410	3409	3209	3212	0.	1.	0.		
CBEAM	3411	3405	3210	3211	0.	0.	1.		
CBEAM	3412	3409	3211	3212	0.	0.	1.		
CBEAM	3413	3405	3212	3213	0.	0.	1.		
CBEAM	4148	4148	3086	3087	0.	0.	1.		
CBEAM	4149	4148	3087	3088	0.	0.	1.		
CBEAM	4150	4148	3088	3090	0.	0.	1.		
CBEAM	4151	4151	3086	3087	0.	0.	1.		
CBEAM	4152	4151	3087	3088	0.	0.	1.		
CBEAM	4153	4151	3088	3089	0.	0.	1.		
CBEAM	4154	4151	3089	3090	0.	0.	1.		
CBEAM	5002	5002	153	267	1.	0.	0.		
CBEAM	5051	5051	156	458	1.	0.	0.		
CBEAM	5052	5052	458	459	1.	0.	0.		
CBEAM	5053	5053	459	268	1.	0.	0.		
CELAS2	61	36.6E6	34	5	35	5			
CELAS2	62	71.0E6	40	5	41	5			
CELAS2	63	94.1E6	48	5	49	5			
CELAS2	64	132.4E6	57	5	58	5			
CELAS2	65	110.0E6	69	5	70	5			
CELAS2	66	51.7E6	82	5	83	5			
CELAS2	67	5.0E6	115	5	116	5			
CELAS2	191	11.25E6	277	5	276	5			
CELAS2	192	22.0E6	291	5	290	5			
CELAS2	193	9.68E6	294	5	293	5			
CELAS2	194	156610.	298	3	195	3			
CELAS2	195	67829.	284	3	196	3			
CELAS2	1172	5650000.	17	4	30	4			
CELAS2	1173	5590000.	15	4	27	4			
CELAS2	1174	1600000.	13	4	25	4			
CELAS2	1175	2030000.	11	4	23	4			
CELAS2	1221	3307000.	142	4	141	4			
CELAS2	1222	268300.	141	4	140	4			
CELAS2	1223	137300.	140	4	139	4			
CELAS2	1224	105200.	139	4	138	4			
CELAS2	1225	85600.	138	4	137	4			
CELAS2	1226	69900.	137	4	136	4			
CELAS2	1227	57700.	136	4	135	4			
CELAS2	1228	40000.	135	4	134	4			
CELAS2	1229	6229750.	142	4	119	4			
CELAS2	3161	193.E6	3076	4	3083	4			
CELAS2	3414	1515.E5	3204	4	3207	4			
CELAS2	3415	1724.E5	3212	4	3208	4			
CELAS2	3416	580.4E5	3204	6	3207	6			
CELAS2	3417	2652.5E5	3208	6	3209	6			
CELAS2	3418	732.68E5	3208	5	3209	5			
CONM1	301	19	0						
+301	9.565								
CONM1	302	72	0						
+302	16.770								
CONM1	303	20	0						
+303	7.972								
CONM1	304	60	0						
+304	10.110								
CONM1	305	73	0						
+305	7.755								
CONM1	306	21	0						
+306	3.712								
CONM1	307	61	0						
+307	20.285								
CONM1	308	74	0						
+308	9.982								
CONM1	309	51	0						
+309	32.156								
CONM1	310	62	0						
+310	25.281								
CONM1	311	75	0						
+311	14.285								
CONM1	312	26	0						
+312	42.942								
CONM1	313	52	0						
+313	57.288								
CONM1	314	64	0						
+314	46.648								
CONM1	315	77	0						
+315	20.983								
CONM1	316	29	0						
+316	60.677								
CONM1	317	44	0						
+317	80.964								
CONM1	318	53	0						
+318	74.861								
CONM1	319	65	0						
+319	56.266								
CONM1	320	78	0						
+320	28.341								
CONM1	321	33	0						
+321	37.854								
CONM1	322	39	0						
+322	99.621								
CONM1	323	47	0						
+323	105.244								
CONM1	324	56	0						
+324	95.811								
CONM1	325	68	0						

+3397									
+3398									
+3403									
+3404									
+3407									
+301									
+302									
+303									
+304									
+305									
+306									
+307									
+308									
+309									
+310									
+311									
+312									
+313									
+314									
+315									
+316									
+317									
+318									
+319									
+320									
+321									
+322									
+323									
+324									
+325									

+325	83.620								
CONM1	326	81	0						+326
+326	33.148								
CONM1	341	85	0						+341
+341	.6								
CONM1	342	86	0						+342
+342	1.6								
CONM1	343	87	0						+343
+343	1.8								
CONM1	344	88	0						+344
+344	1.								
CONM1	345	6	0						+345
+345	12.03								
CONM1	346	17	0						+346
+346	57.78								
CONM1	347	5	0						+347
+347	10.08								
CONM1	348	15	0						+348
+348	42.72								
CONM1	349	4	0						+349
+349	6.92								
CONM1	350	13	0						+350
+350	27.67								
CONM1	351	3	0						+351
+351	5.17								
CONM1	352	11	0						+352
+352	27.65								
CONM1	353	2	0						+353
+353	4.08								
CONM1	354	9	0						+354
+354	3.71								
CONM1	355	95	0						+355
+355	9.133								
CONM1	356	107	0						+356
+356	6.765								
CONM1	357	113	0						+357
+357	.022								
CONM1	358	93	0						+358
+358	10.32								
CONM1	359	106	0						+359
+359	10.12								
CONM1	360	112	0						+360
+360	.149								
CONM1	361	124	0						+361
+361	5.816								
CONM1	362	130	0						+362
+362	7.986								
CONM1	363	133	0						+363
+363	.998								
CONM1	364	92	0						+364
+364	4.56								
CONM1	365	105	0						+365
+365	6.797								
CONM1	366	111	0						+366
+366	.952								
CONM1	367	123	0						+367
+367	3.296								
CONM1	368	129	0						+368

CONM1	410	281	0	796.72
CONM1	411	153	0	
+411				
+411A		119126.		
CONM1	412	154	0	
+412				
+412A		498740.		
CONM1	413	155	0	
+413				
+413A		233410.		
CONM1	414	156	0	
+414				
+414A		865169.		
CONM1	415	42	0	
+415				
+415A		1051483.		
CONM1	416	71	0	
+416				
+416A		1042917.		
CONM1	417	286	0	
+417				
+417A		556929.		
CONM1	418	284	0	
+418				
+418A		756147.		
CONM1	430	195	0	
+430		-82.94		
CONM1	431	296	0	
+431				
CONM1	432	296	0	
+432		2073.44		
CONM1	433	42	0	
+433				
+434				
+434A				
CONM1	435	281	0	
+435				
+435A				
CONM1	436	410	0	
+436				
+436A		502624.		
CONM1	437	410	0	
+437				
+437A				
CONM1	438	410	0	1990.5
CONM1	446	251	0	
+446		4.65		
CONM1	447	252	0	
+447		5.123		
CONM1	448	253	0	
+448		4.812		
CONM1	449	254	0	
+449		3.069		
CONM1	450	255	0	
+450		1.73		
CONM1	451	256	0	
+451		2.547		
CONM1	452	233	0	
+452		176.302		
CONM1	453	257	0	
+453		31.053		
CONM1	454	258	0	
+454		17.674		
CONM1	455	259	0	
+455		11.742		
CONM1	456	260	0	
+456		7.391		
CONM1	457	261	0	
+457		2.877		
CONM1	458	262	0	
+458		3.875		
CONM1	459	263	0	
+459		3.064		
CONM1	460	264	0	
+460		2.838		
CONM1	461	265	0	
+461		2.73		
CONM1	462	266	0	
+462		.976		
CONM1	501	407	0	18.24
CONM1	502	409	0	24.64
CONM1	503	367	0	23.43
CONM1	504	408	0	30.93
CONM1	505	368	0	4.55
CONM1	506	359	0	15.9
CONM1	507	384	0	15.24
CONM1	508	389	0	.75
CONM1	509	369	0	3.81
CONM1	510	360	0	6.67
CONM1	511	385	0	5.77
CONM1	512	390	0	1.11
CONM1	513	370	0	2.55
CONM1	514	361	0	3.55
CONM1	515	386	0	3.1
CONM1	516	391	0	.93
CONM1	517	371	0	1.12
CONM1	518	362	0	2.9
CONM1	519	387	0	2.4
CONM1	520	392	0	.59
CONM1	521	393	0	.37
CONM1	522	373	0	1.94
CONM1	523	364	0	.48
CONM1	524	381	0	2.66
CONM1	525	383	0	.89
CONM1	526	281	0	
+526				
CONM1	3020	3004		
+3020		23.24		
CONM1	3021	3006		
+3021		21.35		
CONM1	3022	3009		
+3022		14.41		
CONM1	3023	3002		
+3023		16.5		

3803477.

12204.0

1990.5

822933.

+411

+411A

+412

+412A

+413

+413A

+414

+414A

+415

+415A

+416

+416A

+417

+417A

+418

+418A

+430

+431

+432

+434

+434A

+435

+435A

+436

+436A

+437

+437A

+446

+447

+448

+449

+450

+451

+452

+453

+454

+455

+456

+457

+458

+459

+460

+461

+462

+526

+3020

+3021

+3022

+3023

CONM1	3045	3088	200.	200.	+3045
+3045	200.			236476.8	+3045A
+3045A		1947.			236476.
CONM1	3176	3076	0		+3176
+3176	25.4				
CONM1	3177	3079	0	25.4	
CONM1	3178	3080	0	56.46	+3178
+3178	56.73				
CONM1	3179	3081	0		+3179
+3179	-4.88				
CONM1	3180	3082	0	7.47	
CONM1	3181	3083	0		87.0
CONM1	3182	3085	0	35.77	+3182
+3182	35.15				
CONM1	3427	3204	0		+3427
+3427	208.0			125.E3	
CONM1	3428	3206	0		208.
CONM1	3429	3207	0	208.0	+3429
+3429					+3429A
+3429A					125.E3
CONM1	3430	3210	0	.01	+40430
+40430	.01				
CONM1	3431	3211	0	229.3	+40431
+40431	229.3			561149.	+40431A
+40431A		32000.			561149.
CONM1	3432	3212	0		231.3
CONM1	3433	3213	0	2.0	+40433
+40433	2.0				
CONM2	3501	3500	345.	0.	+000001
+000001	448146.7		3013.92	0.	0.
CONM2	3504	3501	138.	0.	0.
+000003	66538.01		6769.7		0.
CONM2	183	272	2		16.0875
CONM2	2201	233	2	.0001	
CONM2	2202	233	2	.0001	
CONM2	2203	251	2	.0001	
CONM2	2204	251	2	.0001	
CONM2	2205	252	2	.0001	
CONM2	2206	252	2	.0001	
CONM2	2207	253	2	.0001	
CONM2	2208	253	2	.0001	
CONM2	2209	254	2	.0001	
CONM2	2210	254	2	.0001	
CONM2	2211	255	2	.0001	
CONM2	2212	255	2	.0001	
CONM2	2213	256	2	.0001	
CONM2	2214	256	2	.0001	
CONM2	2215	257	2	.0001	
CONM2	2216	257	2	.0001	
CONM2	2217	258	2	.0001	
CONM2	2218	258	2	.0001	
CONM2	2219	259	2	.0001	
CONM2	2220	259	2	.0001	
CONM2	2221	260	2	.0001	
CONM2	2222	260	2	.0001	
CONM2	2223	261	2	.0001	
CONM2	2224	261	2	.0001	
CONM2	2225	262	2	.0001	
CONM2	2226	262	2	.0001	
CONM2	2227	263	2	.0001	
CONM2	2228	263	2	.0001	
CONM2	2229	264	2	.0001	
CONM2	2230	264	2	.0001	
CONM2	2231	265	2	.0001	
CONM2	2232	265	2	.0001	
CONM2	2233	266	2	.0001	
CONM2	2234	266	2	.0001	
CONM2	3010	3004	3007	2	4.5
CONM2	3160	3080	3082	2	20.
COR1R	5	701	702	703	
COR2C	*3	0			
*COR2C	0.				
+COR2C	-63.574	-294.247100.			
COR2R	1	0			
*COR2R	19.092002	-234.923915	0.		
COR2R	7	0			
*COR2R	57.2946361	-362.5403399	0.		
CQUAD4	601	601	1033	1038	1032
CQUAD4	602	602	1039	1047	1046
CQUAD4	603	603	1047	1056	1055
CQUAD4	604	604	1056	1068	1067
CQUAD4	605	605	1068	1081	1080
CQUAD4	607	607	1038	1182	1181
CQUAD4	608	608	1038	1046	1183
CQUAD4	609	609	1046	1055	1184
CQUAD4	610	610	1055	1067	1185
CQUAD4	611	611	1067	1080	1186
CQUAD4	613	613	1182	1183	1044
CQUAD4	614	614	1183	1184	1053
CQUAD4	615	615	1184	1185	1065
CQUAD4	616	616	1185	1186	1078
CQUAD4	618	618	1027	1044	1188
CQUAD4	619	619	1044	1053	1189
CQUAD4	620	620	1053	1065	1190
CQUAD4	621	621	1065	1078	1191
CQUAD4	623	623	1188	1189	1052
CQUAD4	624	624	1189	1190	1064
CQUAD4	625	625	1190	1191	1077
CQUAD4	627	627	1025	1052	1193
CQUAD4	628	628	1052	1064	1063
CQUAD4	632	632	1192	1193	1051
CQUAD4	633	633	1193	1063	1062
CQUAD4	634	634	1063	1245	1244
CQUAD4	635	635	1245	1076	1075
CQUAD4	639	639	1062	1061	1021
CQUAD4	640	640	1062	1244	1243
CQUAD4	641	641	1244	1075	1074
CQUAD4	643	643	1021	1061	1060
CQUAD4	644	644	1061	1243	1242
CQUAD4	645	645	1243	1074	1073
CQUAD4	648	648	1060	1242	1143
CQUAD4	649	649	1242	1073	1072
CQUAD4	661	661	1142	1101	1100
CQUAD4	662	662	1101	1107	1106

*CORD3A

*CORD3B

*CORD1

*CORD7

CQUAD4	663	663	1107	1113	1112	1106
CQUAD4	664	664	1141	1100	1127	1140
CQUAD4	665	665	1100	1106	1130	1127
CQUAD4	666	666	1106	1112	1133	1130
CQUAD4	667	667	1140	1127	1099	1139
CQUAD4	668	668	1127	1130	1105	1099
CQUAD4	669	669	1130	1133	1111	1105
CQUAD4	670	670	1139	1099	1126	1138
CQUAD4	671	671	1099	1105	1129	1126
CQUAD4	672	672	1105	1111	1132	1129
CQUAD4	673	673	1138	1126	1098	1137
CQUAD4	674	674	1126	1129	1104	1098
CQUAD4	675	675	1129	1132	1110	1104
CQUAD4	676	676	1137	1098	1125	1136
CQUAD4	677	677	1098	1104	1128	1125
CQUAD4	678	678	1104	1110	1131	1128
CQUAD4	679	679	1136	1125	1097	1135
CQUAD4	680	680	1125	1128	1103	1097
CQUAD4	681	681	1128	1131	1109	1103
CQUAD4	682	682	1135	1097	1096	1134
CQUAD4	683	683	1097	1103	1102	1096
CQUAD4	684	684	1103	1109	1108	1102
CQUAD4	1601	601	2033	2039	2032	
CQUAD4	1602	602	2039	2047	2046	2038
CQUAD4	1603	603	2047	2056	2055	2046
CQUAD4	1604	604	2056	2068	2067	2055
CQUAD4	1605	605	2068	2081	2080	2067
CQUAD4	1607	607	2038	2182	2181	2030
CQUAD4	1608	608	2038	2046	2183	2182
CQUAD4	1609	609	2046	2055	2184	2183
CQUAD4	1610	610	2055	2067	2185	2184
CQUAD4	1611	611	2067	2080	2186	2185
CQUAD4	1613	613	2182	2183	2044	2029
CQUAD4	1614	614	2183	2184	2053	2044
CQUAD4	1615	615	2184	2185	2065	2053
CQUAD4	1616	616	2185	2186	2078	2065
CQUAD4	1618	618	2027	2044	2188	2187
CQUAD4	1619	619	2044	2053	2189	2188
CQUAD4	1620	620	2053	2065	2190	2189
CQUAD4	1621	621	2065	2078	2191	2190
CQUAD4	1623	623	2188	2189	2052	2026
CQUAD4	1624	624	2189	2190	2064	2052
CQUAD4	1625	625	2190	2191	2077	2064
CQUAD4	1627	627	2025	2052	2193	2192
CQUAD4	1628	628	2052	2064	2063	2193
CQUAD4	1632	632	2192	2193	2051	2024
CQUAD4	1633	633	2193	2063	2062	2051
CQUAD4	1634	634	2063	2245	2244	2062
CQUAD4	1635	635	2245	2076	2075	2244
CQUAD4	1639	639	2062	2061	2021	2022
CQUAD4	1640	640	2062	2244	2243	2061
CQUAD4	1641	641	2244	2075	2074	2243
CQUAD4	1643	643	2021	2061	2060	2020
CQUAD4	1644	644	2061	2243	2242	2060
CQUAD4	1645	645	2243	2074	2073	2242
CQUAD4	1648	648	2060	2242	2143	2019
CQUAD4	1649	649	2242	2073	2072	2143
CQUAD4	1661	661	2142	2101	2100	2141
CQUAD4	1662	662	2101	2107	2106	2100
CQUAD4	1663	663	2107	2113	2112	2106
CQUAD4	1664	664	2141	2100	2127	2140
CQUAD4	1665	665	2100	2106	2130	2127
CQUAD4	1666	666	2106	2112	2133	2130
CQUAD4	1667	667	2140	2127	2099	2139
CQUAD4	1668	668	2127	2130	2105	2099
CQUAD4	1669	669	2130	2133	2111	2105
CQUAD4	1670	670	2139	2099	2126	2138
CQUAD4	1671	671	2099	2105	2129	2126
CQUAD4	1672	672	2105	2111	2132	2129
CQUAD4	1673	673	2138	2126	2098	2137
CQUAD4	1674	674	2126	2129	2104	2098
CQUAD4	1675	675	2129	2132	2110	2104
CQUAD4	1676	676	2137	2098	2125	2136
CQUAD4	1677	677	2098	2104	2128	2125
CQUAD4	1678	678	2104	2110	2131	2128
CQUAD4	1679	679	2136	2125	2097	2135
CQUAD4	1680	680	2125	2128	2103	2097
CQUAD4	1681	681	2128	2131	2109	2103
CQUAD4	1682	682	2135	2097	2096	2134
CQUAD4	1683	683	2097	2103	2102	2096
CQUAD4	1684	684	2103	2109	2108	2102
CQUAD8	701	701	1257	1252	1251	1233
+701	1506	1512				1507
CQUAD8	702	702	1252	1257	1258	1253
+702	1508	1502				1507
CQUAD8	703	703	1253	1258	1259	1254
+703	1509	1503				1508
CQUAD8	704	704	1254	1259	1260	1255
+704	1510	1504				1509
CQUAD8	705	705	1255	1260	1261	1256
+705	1511	1505				1510
CQUAD8	707	707	1257	1262	1263	1258
+707	1519	1513				1518
CQUAD8	708	708	1258	1263	1264	1259
+708	1520	1514				1519
CQUAD8	709	709	1259	1264	1265	1260
+709	1521	1515				1520
CQUAD8	710	710	1260	1265	1266	1261
+710	1522	1516				1521
CQUAD8	1701	701	2257	2252	2251	2233
+1701	2506	2512				2507
CQUAD8	1702	702	2252	2257	2258	2253
+1702	2508	2502				2509
CQUAD8	1703	703	2253	2258	2259	2254
+1703	2509	2503				2510
CQUAD8	1704	704	2254	2259	2260	2255
+1704	2510	2504				2511
CQUAD8	1705	705	2255	2260	2261	2256
+1705	2511	2505				2512
CQUAD8	1707	707	2257	2262	2263	2258
+1707	2519	2513				2519
CQUAD8	1708	708	2258	2263	2264	2259
+1708	2520	2514				2520
CQUAD8	1709	709	2259	2264	2265	2260

+1709	2521	2515				99.5
CQUAD8	1710	710	2260	2265	2266	2261
+1710	2522	2516				2521
CSHEAR	71	71	1034	1040	1037	1031
CSHEAR	72	72	1040	1048	1045	1037
CSHEAR	73	73	1048	1057	1054	1045
CSHEAR	74	74	1057	1069	1066	1054
CSHEAR	75	75	1069	1082	1121	1066
CSHEAR	76	76	1094	1079	1114	1121
CSHEAR	77	77	2034	2040	2037	2031
CSHEAR	78	78	2040	2048	2045	2037
CSHEAR	79	79	2048	2057	2054	2045
CSHEAR	80	80	2057	2069	2066	2054
CSHEAR	81	81	2069	2082	2121	2066
CSHEAR	82	82	2094	2079	2114	2121
CSHEAR	201	201	1465	1464	1466	1467
CSHEAR	202	202	1275	1276	1464	1465
CSHEAR	203	203	1280	1290	1276	1275
CSHEAR	204	204	1114	1079	1293	1292
CSHEAR	205	205	2465	2464	2466	2467
CSHEAR	206	206	2275	2276	2464	2465
CSHEAR	207	207	2280	2290	2276	2275
CSHEAR	208	208	2114	2079	2293	2292
CSHEAR	642	642	1075	1089	1087	1074
CSHEAR	646	646	1074	1087	1086	1073
CSHEAR	650	650	1073	1086	1085	1072
CSHEAR	651	651	1007	1018	1016	1006
CSHEAR	652	652	1006	1016	1180	1176
CSHEAR	653	653	1176	1180	1014	1005
CSHEAR	654	654	1005	1014	1179	1175
CSHEAR	655	655	1175	1179	1012	1004
CSHEAR	656	656	1004	1012	1178	1174
CSHEAR	657	657	1174	1178	1010	1003
CSHEAR	658	658	1003	1010	1177	1173
CSHEAR	659	659	1173	1177	1194	1192
CSHEAR	660	660	1002	1194	1008	1001
CSHEAR	1642	642	2075	2088	2087	2074
CSHEAR	1646	646	2074	2087	2086	2073
CSHEAR	1650	650	2073	2086	2085	2072
CSHEAR	1651	651	2007	2018	2016	2006
CSHEAR	1652	652	2006	2016	2180	2176
CSHEAR	1653	653	2176	2180	2014	2005
CSHEAR	1654	654	2005	2014	2179	2175
CSHEAR	1655	655	2175	2179	2012	2004
CSHEAR	1656	656	2004	2012	2178	2174
CSHEAR	1657	657	2174	2178	2010	2003
CSHEAR	1658	658	2003	2010	2177	2173
CSHEAR	1659	659	2173	2177	2194	2002
CSHEAR	1660	660	2002	2194	2008	2001
CSHEAR	3158	3158	3091	3092	3094	3093
CSHEAR	3159	3158	3095	3096	3098	3097
CTRIA3	606	606	1032	1038	1030	
CTRIA3	612	612	1181	1182	1029	
CTRIA3	617	617	1029	1044	1027	
CTRIA3	622	622	1187	1188	1026	
CTRIA3	626	626	1026	1052	1025	
CTRIA3	629	629	1064	1245	1063	
CTRIA3	630	630	1064	1077	1245	
CTRIA3	631	631	1077	1076	1245	
CTRIA3	636	636	1051	1023	1024	
CTRIA3	637	637	1051	1022	1023	
CTRIA3	638	638	1062	1022	1051	
CTRIA3	647	647	1019	1020	1060	
CTRIA3	1606	606	2032	2038	2030	
CTRIA3	1612	612	2181	2182	2029	
CTRIA3	1617	617	2029	2044	2027	
CTRIA3	1622	622	2187	2188	2026	
CTRIA3	1626	626	2026	2052	2025	
CTRIA3	1629	629	2064	2245	2063	
CTRIA3	1630	630	2064	2077	2245	
CTRIA3	1631	631	2077	2076	2245	
CTRIA3	1636	636	2051	2023	2024	
CTRIA3	1637	637	2051	2022	2023	
CTRIA3	1638	638	2062	2022	2051	
CTRIA3	1647	647	2019	2020	2060	
CTRIA6	706	706	1262	1257	1233	1518
+706	99.5					1512
CTRIA6	1706	706	2262	2257	2233	2518
+1706	99.5					2512
DMIG	*VTAIL	0	6	1	0	
DMIG	*VTAIL	1	357</			

*9028	363	1	0.334950E+05
DMIG	*VTAIL	364	1
*9029	357	1	-1.78665E+00
*9030	358	1	0.286879E+01
*9031	359	1	-1.79730E+02
*9032	360	1	0.822153E+02
*9033	361	1	-3.08830E+03
*9034	362	1	0.163581E+04
*9035	363	1	-9.934300E+04
*9036	364	1	0.133364E+05
DMIG	*VTAIL	367	1
*9037	357	1	0.156429E+04
*9038	358	1	-1.26722E+05
*9039	359	1	-2.49630E+02
*9040	360	1	0.252357E+03
*9041	361	1	0.220342E+02
*9042	362	1	-3.48368E+01
*9043	363	1	0.213553E+02
*9044	364	1	0.287588E+00
*9045	367	1	0.573159E+05
DMIG	*VTAIL	368	1
*9046	357	1	0.150006E+03
*9047	358	1	-3.49447E+04
*9048	359	1	-1.84666E+05
*9049	360	1	-5.97411E+03
*9050	361	1	0.413201E+03
*9051	362	1	-4.89800E+02
*9052	363	1	-2.71009E+00
*9053	364	1	-2.02789E+01
*9054	367	1	-5.02776E+04
*9055	368	1	0.246725E+05
DMIG	*VTAIL	369	1
*9056	357	1	0.292477E+03
*9057	358	1	0.106678E+04
*9058	359	1	-3.72974E+04
*9059	360	1	-1.63066E+05
*9060	361	1	-7.20338E+03
*9061	362	1	0.400484E+03
*9062	363	1	0.516836E+00
*9063	364	1	-1.41972E+02
*9064	367	1	0.245134E+03
*9065	368	1	-6.25047E+04
*9066	369	1	0.208907E+05
DMIG	*VTAIL	370	1
*9067	357	1	0.109520E+02
*9068	358	1	-4.29165E+02
*9069	359	1	0.371999E+03
*9070	360	1	-2.38343E+04
*9071	361	1	-1.47446E+05
*9072	362	1	0.690143E+03
*9073	363	1	0.723676E+03
*9074	364	1	0.244021E+02
*9075	367	1	-5.74195E+02
*9076	368	1	0.416297E+03
*9077	369	1	-4.16404E+04
*9078	370	1	0.182966E+05
DMIG	*VTAIL	371	1
*9079	357	1	-3.19898E+00
*9080	358	1	-1.05520E+02
*9081	359	1	0.537074E+02
*9082	360	1	0.115046E+03
*9083	361	1	-4.55381E+03
*9084	362	1	-1.31301E+05
*9085	363	1	0.208463E+04
*9086	364	1	-2.71085E+03
*9087	367	1	0.123231E+02
*9088	368	1	-2.34544E+03
*9089	369	1	0.874696E+03
*9090	370	1	-7.44486E+04
*9091	371	1	0.300624E+05
DMIG	*VTAIL	372	1
*9092	357	1	0.463602E+00
*9093	358	1	-6.77371E+01
*9094	359	1	-1.34083E+02
*9095	360	1	0.577641E+02
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*9097	362	1	-9.15742E+03
*9098	363	1	-5.44593E+04
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*9101	368	1	0.789193E+02
*9102	369	1	-3.15023E+03
*9103	370	1	0.187626E+04
*9104	371	1	-1.92798E+05
*9105	372	1	0.276338E+05
DMIG	*VTAIL	373	1
*9106	357	1	0.484957E+02
*9107	358	1	0.440965E+00
*9108	359	1	-6.91597E+00
*9109	360	1	-8.75753E+00
*9110	361	1	0.363362E+02
*9111	362	1	0.411035E+01
*9112	363	1	-1.63347E+04
*9113	364	1	-2.58823E+04
*9114	367	1	0.345739E+00
*9115	368	1	-4.22117E+01
*9116	369	1	0.101714E+02
*9117	370	1	-6.39444E+02
*9118	371	1	0.270474E+04
*9119	372	1	-7.30833E+04
*9120	373	1	0.703131E+04
DMIG	*VTAIL	375	1
*9121	357	1	-2.30046E+04
*9122	358	1	-4.97159E+05
*9123	359	1	0.157355E+04
*9124	360	1	0.126726E+04
*9125	361	1	0.195610E+03
*9126	362	1	-2.47898E+02
*9127	363	1	0.635440E+01
*9128	364	1	-7.84751E+00
*9129	367	1	0.378804E+03
*9130	368	1	-1.42639E+04
*9131	369	1	0.123205E+04
*9132	370	1	0.216183E+03

*9029	371	1	
*9030	372	1	
*9031	373	1	
*9032	375	1	
DMIG	*VTAIL	376	1
*9033	357	1	0.922286E+03
*9034	358	1	0.349061E+04
*9035	359	1	-2.72521E+05
*9036	360	1	0.153243E+04
*9037	361	1	0.667605E+03
*9038	362	1	-7.40884E+01
*9039	363	1	-2.43058E+02
*9040	364	1	0.583973E+00
*9041	367	1	0.194037E+04
*9042	368	1	0.129929E+04
*9043	369	1	0.235053E+04
*9044	370	1	0.756407E+03
*9045	371	1	0.771059E+02
*9046	372	1	-6.00606E+00
*9047	373	1	0.197780E+01
*9048	375	1	-3.11505E+05
*9049	376	1	0.109246E+06
DMIG	*VTAIL	377	1
*9050	357	1	0.317443E+03
*9051	358	1	0.219380E+04
*9052	359	1	0.208271E+04
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*9055	362	1	0.550257E+03
*9056	363	1	0.811533E+02
*9057	364	1	-2.11053E+00
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*9060	369	1	0.884905E+03
*9061	370	1	0.158823E+04
*9062	371	1	0.561757E+03
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*9064	373	1	0.714289E+01
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DMIG	*VTAIL	378	1
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*9068	358	1	0.133390E+03
*9069	359	1	0.711357E+03
*9070	360	1	0.202839E+04
*9071	361	1	-2.61682E+05
*9072	362	1	0.139574E+04
*9073	363	1	0.872899E+03
*9074	364	1	0.177372E+03
*9075	367	1	0.741269E+02
*9076	368	1	0.487425E+03
*9077	369	1	0.121023E+04
*9078	370	1	0.188910E+04
*9079	371	1	0.140030E+04
*9080	372	1	0.265625E+03
*9081	373	1	0.127903E+03
*9082	375	1	-2.34087E+03
*9083	376	1	0.178520E+04
*9084	377	1	-1.13866E+05
*9085	378	1	0.701957E+05
DMIG	*VTAIL	379	1
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*9087	358	1	-3.83492E+02
*9088	359	1	0.749947E+02
*9089	360	1	0.542347E+03
*9090	361	1	0.295398E+04
*9091	362	1	-1.56110E+05
*9092	363	1	0.237945E+03
*9093	364	1	0.100000E+04
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*9098	371	1	0.192022E+04
*9099	372	1	0.747017E+03
*9100	373	1	0.679657E+03
*9101	375	1	0.693183E+02
*9102	376	1	-5.25747E+03
*9103	377	1	0.193872E+04
*9104	378	1	-1.43803E+05
*9105	379	1	0.259716E+05
DMIG	*VTAIL	380	1
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*9108	359	1	-3.88187E+01
*9109	360	1	0.424170E+02
*9110	361	1	0.491571E+03
*9111	362	1	0.156462E+04
*9112	363	1	-1.88062E+05
*9113	364	1	-2.22663E+04
*9114	367	1	0.511802E+00
*9115	368	1	-3.37087E+01
*9116	369	1	0.222733E+02
*9117	370	1	0.254233E+03
*9118	371	1	0.570111E+03
*9119	372	1	0.211878E+04
*9120	373	1	0.303574E+03
*9121	375	1	-2.36553E+02
*9122	376	1	0.872011E+02
*9123	377	1	-2.26099E+03
*9124	378	1	0.236420E+04
*9125	379	1	-1.00636E+05
*9126	380	1	0.832375E+05
DMIG	*VTAIL	381	1
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*9128	358	1	-1.27980E+00
*9129	359	1	-6.70087E+00
*9130	360	1	-4.48327E+01
*9131	361	1	-5.02647E+02
*9132	362	1	0.467089E+02
*9133	363	1	0.163977E+04
*9134	364	1	-4.79445E+04
*9135	367	1	-1.10671E+00

*9134	371	1	-4.67290E+02
*9135	372	1	0.428324E+01
*9136	373	1	-9.14807E+00
	375	1	0.925573E+06
	DMIG	*VTAIL	376
			1
			0.922286E+03
			0.349061E+04
			-2.72521E+05
			0.153243E+04
			0.667605E+03
			-7.40884E+01
			-2.43058E+02
			0.583973E+00
			0.194037E+04
			0.129929E+04
			0.235053E+04
			0.756407E+03
			0.771059E+02
			-6.00606E+00
			0.197780E+01
			-3.11505E+05
			0.109246E+06
			1
			0.317443E+03
			0.219380E+04
			0.208271E+04
			-2.79276E+05
			0.110103E+04
			0.550257E+03
			0.811533E+02
			-2.11053E+00
			0.716540E+03
			0.171546E+04
			0.884905E+03
			0.158823E+04
			0.561757E+03
			0.690199E+02
			0.714289E+01
			0.363833E+04
			-1.87741E+05
			0.775901E+05
			1
			-1.110646E+02
			0.133390E+03
			0.711357E+03
			0.202839E+04
			-2.61682E+05
			0.139574E+04
			0.872899E+03
			0.177372E+03
			0.741269E+02
			0.487425E+03
			0.121023E+04
			0.188910E+04
			0.140030E+04
			0.265625E+03
			0.127903E+03
			-2.34087E+03
			0.178520E+04
			-1.13866E+05
			0.701957E+05
			1
			0.555097E+00
			-3.83492E+02
			0.749947E+02
			0.542347E+03
			0.295398E+04
			-1.56110E+05
			0.237945E+03

*9241	368	1	0.669332E+00	*9242	385	1	0.349451E+05	
*9242	369	1	-.571058E+01	*9243	DMIG	*VTAIL	386	
*9243	370	1	-.182164E+02	*9244	*9352	357	1	0.106815E+00
*9244	371	1	-.460481E+02	*9245	*9353	358	1	-.224760E+02
*9245	372	1	0.878765E+02	*9246	*9354	359	1	0.196095E+03
*9246	373	1	0.449404E+03	*9247	*9355	360	1	-.359483E+03
*9247	375	1	0.842499E+01	*9248	*9356	361	1	0.606719E+04
*9248	376	1	-.320128E+02	*9249	*9357	362	1	0.281741E+03
*9249	377	1	0.773381E+02	*9250	*9358	363	1	0.117268E+03
*9250	378	1	-.617478E+03	*9251	*9359	364	1	0.195964E+02
*9251	379	1	0.379035E+04	*9252	*9360	367	1	-.452626E+00
*9252	380	1	-.113558E+05	*9253	*9361	368	1	0.496996E+02
*9253	381	1	0.131793E+05		*9362	369	1	0.352965E+03
DMIG	*VTAIL	382	1		*9363	370	1	-.142282E+03
*9254	357	1	-.211797E-02	*9254	*9364	371	1	0.322191E+03
*9255	358	1	0.196775E-01	*9255	*9365	372	1	0.854219E+02
*9256	359	1	-.154809E+00	*9256	*9366	373	1	0.160192E+02
*9257	360	1	0.835219E+00	*9257	*9367	375	1	0.323717E+03
*9258	361	1	0.461861E+01	*9258	*9368	376	1	-.318303E+02
*9259	362	1	0.160099E+02	*9259	*9369	377	1	-.420586E+03
*9260	363	1	0.393001E+02	*9260	*9370	378	1	-.314870E+05
*9261	364	1	0.813303E+03	*9261	*9371	379	1	-.689858E+03
*9262	367	1	0.352611E-02	*9262	*9372	380	1	0.423422E+01
*9263	368	1	-.218807E-01	*9263	*9373	381	1	0.102897E+02
*9264	369	1	0.135616E+00	*9264	*9374	382	1	0.527408E+00
*9265	370	1	0.447717E+01	*9265	*9375	383	1	0.337155E-01
*9266	371	1	0.122064E+02	*9266	*9376	384	1	0.643374E+03
*9267	372	1	0.882424E+01	*9267	*9377	385	1	-.357044E+04
*9268	373	1	-.479232E+02	*9268	*9378	386	1	0.322247E+05
*9269	375	1	0.117696E+00	*9269	DMIG	*VTAIL	387	
*9270	376	1	-.551862E+00	*9270	*9379	357	1	-.338835E+00
*9271	377	1	0.991771E+00	*9271	*9380	358	1	-.546516E-01
*9272	378	1	-.439420E+01	*9272	*9381	359	1	0.188194E+00
*9273	379	1	-.139387E+03	*9273	*9382	360	1	0.399533E-01
*9274	380	1	0.164894E+04	*9274	*9383	361	1	0.777587E-02
*9275	381	1	-.475810E+03	*9275	*9384	362	1	-.905881E-03
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DMIG	*VTAIL	383	1		*9386	364	1	0.368288E-04
*9277	357	1	0.311274E-03	*9277	*9387	367	1	-.149039E-01
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GRID	64	0	-120.000-370.601	.000 0
GRID	65	0	-86.000 -364.494	.000 0
GRID	66	0	-41.500 -356.500	.000 0
GRID	67	0	-54.216 -358.784	.000 0
GRID	68	0	-41.500 -356.500	.000 0
GRID	69	0	-25.500 -356.500	.000 0
GRID	70	0	-25.500 -356.500	.000 0
GRID	71	0	.000 -356.50	.000 0
GRID	72	0	-180.000-398.678	.000 0
GRID	73	0	-168.385-396.592	.000 0
GRID	74	0	-157.000-394.547	.000 0
GRID	75	0	-139.738-391.446	.000 0
GRID	76	0	-131.000-389.876	.000 7
GRID	77	0	-120.000-387.901	.000 0
GRID	78	0	-86.000 -381.794	.000 0
GRID	79	0	-29.250 -417.400	.000 0
GRID	80	0	-54.216 -376.084	.000 0
GRID	81	0	-41.500 -373.800	.000 7
GRID	82	0	-25.500 -373.800	.000 0
GRID	83	0	-25.500 -373.800	.000 0
GRID	84	0	.000 -373.80	.000 0
GRID	85	0	-180.000-406.675	.000 0
GRID	86	0	-168.385-406.191	.000 0
GRID	87	0	-157.000-405.717	.000 0
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GRID	89	0	-139.738-393.695	.000 0
GRID	90	0	-130.626-392.267	.000 0
GRID	91	0	-111.224-389.227	.000 0
GRID	92	0	-85.970 -385.270	.000 0
GRID	93	0	-53.000 -380.104	.000 0
GRID	94	0	-29.250 -373.800	.000 0
GRID	95	0	-41.500 -378.302	.000 0
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GRID	98	0	-110.476-393.998	.000 0
GRID	99	0	-85.073 -390.992	.000 0
GRID	100	0	-53.000 -387.196	.000 0
GRID	101	0	-41.500 -385.835	.000 0

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GRID	112	0	-53.000 -401.381	.000 0
GRID	113	0	-41.500 -400.902	.000 0
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GRID	120	0	-32.600 -417.400	.000 0
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GRID	132	0	-99.081 -403.302	.000 0
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GRID	136	0	-120.773-391.723	.000 7
GRID	137	0	-111.071-390.203	.000 7
GRID	138	0	-101.371-388.683	.000 7
GRID	139	0	-85.817 -386.246	.000 7
GRID	140	0	-70.262 -383.809	.000 7
GRID	141	0	-53.000 -381.104	.000 7
GRID	142	0	-41.500 -379.302	.000 7
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GRID	184	0	-71.000 -345.799	.000 0
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GRID	188	0	-102.000-335.367	.000 0
GRID	189	0	-102.000-351.367	.000 0
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GRID	191	0	-102.000-384.667	.000 7
GRID	192	0	-131.000-347.852	.000 0
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GRID	196	0	.000 -447.000	.000 0
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GRID	298	0	.000	-385.60.000	0
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GRID	407	0	.000	-446.10025.500	0
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GRID	1003	5	-100.7501	331.560	0
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GRID	1005	5	-40.750	14.678.895	0
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GRID	1008	5	-141.0943	076.845	0
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GRID	1012	5	-75.750	3.524.1.410	0
GRID	1014	5	-40.750	3.763.1.765	0
GRID	1016	5	0.000	4.054.2.190	0
GRID	1018	5	14.758	4.143.2.080	0
GRID	1019	0	-180.000	-381.378.790	0
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GRID	1021	0	-157.000	-366.1541.156	0
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PBAR	2430	2	100.0	100.0	.00001	.001
+2430						+2430
+2430A	1.	.0000001				+2430A
PBAR	2431	2	100.0	100.0	.00001	.001
+2431						+2431
+2431A	1.	.0000001				+2431A
PBAR	2432	2	100.0	100.0	.00001	.001
+2432						+2432
+2432A	1.	.0000001				+2432A
PBAR	2433	2	100.0	100.0	.00001	.001
+2433						+2433
+2433A	1.	.0000001				+2433A
PBAR	2434	2	100.0	100.0	.00001	.001
+2434						+2434
+2434A	1.	.0000001				+2434A
PBAR	2435	2	100.0	100.0	.00001	.001
+2435						+2435
+2435A	1.	.0000001				+2435A
PBAR	2436	2	100.0	100.0	.00001	.001
+2436						+2436
+2436A	1.	.0000001				+2436A
PBAR	2437	2	100.0	100.0	.00001	.001
+2437						+2437
+2437A	1.	.0000001				+2437A
PBAR	2438	2	100.0	100.0	.00001	.001
+2438						+2438
+2438A	1.	.0000001				+2438A
PBAR	2439	2	100.0	100.0	.00001	.001
+2439						+2439
+2439A	1.	.0000001				+2439A
PBAR	2440	2	100.0	100.0	.00001	.001
+2440						+2440
+2440A	1.	.0000001				+2440A
PBAR	2441	2	100.0	100.0	.00001	.001
+2441						+2441
+2441A	1.	.0000001				+2441A
PBAR	2442	2	100.0	100.0	.00001	.001
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+2442A	1.	.0000001				+2442A
PBAR	2443	2	100.0	100.0	.00001	.001
+2443						+2443
+2443A	1.	.0000001				+2443A
PBAR	2444	2	100.0	100.0	.00001	.001
+2444						+2444
+2444A	1.	.0000001				+2444A
PBAR	2445	2	100.0	100.0	.00001	.001
+2445						+2445
+2445A	1.	.0000001				+2445A
PBAR	2446	2	100.0	100.0	.00001	.001
+2446						+2446
+2446A	1.	.0000001				+2446A
PBAR	2447	2	100.0	100.0	.00001	.001
+2447						+2447
+2447A	1.	.0000001				+2447A
PBAR	2448	2	100.0	10		

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+2452	1.	.00000001							
+2452A	2453	2	100.0	100.0	.000001	.001			
+2453	1.	.00000001							
+2453A	2454	2	100.0	100.0	.000001	.001			
+2454	1.	.00000001							
+2454A	2455	2	100.0	100.0	.000001	.001			
+2455	1.	.00000001							
+2455A	2456	2	100.0	100.0	.000001	.001			
+2456	1.	.00000001							
+2456A	2457	2	100.0	100.0	.000001	.001			
+2457	1.	.00000001							
+2457A	2458	2	100.0	100.0	.000001	.001			
+2458	1.	.00000001							
+2458A	2459	2	100.0	100.0	.000001	.001			
+2459	1.	.00000001							
+2459A	2460	2	100.0	100.0	.000001	.001			
+2460	1.	.00000001							
+2460A	3502	2	10000.	99990.	99990.	99990.			
PBEAM	1	2	.690	480.000	371.450		.001		
+1	NO	1.0		593.000	547.400				
+1A	0.	1.							
PBEAM	2	2	.690	593.000	547.400		.001		
+2	NO	1.0		736.000	606.050				
+2A	0.	1.							
PBEAM	3	2	4.140	896.000	655.500		640.		
+3	NO	1.0		912.000	656.500				
+3A	0.	1.							
PBEAM	4	2	4.140	912.000	656.500		2175.		
+4	NO	1.0		3104.000	1780.000				
+4A	0.	1.							
PBEAM	5	2	4.140	3104.000	1780.000		2770.		
+5	NO	1.0		6240.000	3625.000				
+5A	0.	1.							
PBEAM	6	2	3.600	8000.000	4245.000		5250.		
+6	NO	1.0		7900.000	4430.000				
+6A	0.	1.							
PBEAM	7	2	1980.000	7900.000	4430.000		5250.		
+7	NO	1.0		8100.000	4170.000				
+7A	0.	1.							
PBEAM	8	2	1980.000	8100.000	4170.000		5250.		
+8	NO	1.0		9400.000	3900.000				
+8A	0.	1.							
PBEAM	9	2	1980.000	9400.000	3900.000		5250.		
+9	NO	1.0		9400.000	3887.062				
+9A	0.	1.							
PBEAM	10	2	1980.000	9400.000	3887.062		5250.		
+10	NO	1.0		10100.000	3670.000				
+10A	0.	1.							
PBEAM	11	2	1980.000	10100.000	3670.000		5250.		
+11	NO	1.0		1000.000	3691.000				
+11A	0.	1.							
PBEAM	12	2	1980.000	1000.000	3691.000		5250.		
+12	NO	1.0		9600.000	3700.000				
+12A	0.	1.							
PBEAM	13	2	1980.000	9600.000	3700.000		5250.		
+13	NO	1.0		8750.000	3780.000				
+13A	0.	1.							
PBEAM	14	2	1980.000	8750.000	3780.000		5250.		
+14	NO	1.0		8123.630	3590.000				
+14A	0.	1.							
PBEAM	15	2	1980.000	8123.630	3590.000		5250.		
+15	NO	1.0		7200.000	3340.000				
+15A	0.	1.							
PBEAM	16	2	1980.000	7200.000	3340.000		5067.5		
+16	NO	1.0		6425.000	1872.000				
+16A	0.	1.							
PBEAM	17	2	1980.000	6425.0	1872.000		4910.0		
+17	NO	1.0		1980.000	6375.0	1791.00			
+17A	0.	1.		.0000					
PBEAM	18	2	1980.000	6375.0	1791.00		4725.0		
+18	NO	1.0		1980.000	6200.0	1470.00			
+18A	0.	1.							
PBEAM	19	2	1980.000	6200.0	1470.00		4515.0		
+19	NO	1.0		1980.000	6900.0	1374.00			
+19A	0.	1.		.0000					
PBEAM	20	2	1980.000	6900.0	1374.00		4375.5		
+20	NO	1.0		1980.000	8250.0	1167.00			
+20A	0.	1.		.0000					
PBEAM	21	2	1980.000	8250.0	1167.00		4147.5		
+21	NO	1.0		1980.000	8250.0	960.00			
+21A	0.	1.		.0000					
PBEAM	22	2	1.	8250.000	960.00		3885.		
+22	NO	1.0		8250.000					
+22A	0.	0.							
PBEAM	31	2	200.000	9999.0	99999.00		.01		
+31	NO	1.0		197.000					
PBEAM	32	2	200.000	9999.0	99999.00		.01		
+32	NO	1.0		200.000					
PBEAM	33	2	200.000	9999.0	99999.00		.01		
+33	NO	1.0		200.000					
PBEAM	34	2	200.000	9999.0	99999.00		.01		
+34	NO	1.0		207.000					
PBEAM	35	2	200.000	9999.0	99999.00		.01		
+35	NO	1.0		215.000					
PBEAM	36	2	200.000	9999.0	99999.00		.01		
+36	NO	1.0		219.000					
PBEAM	37	2	200.000	9999.0	99999.00		.01		
+37	NO	1.0		222.000					
PBEAM	38	2	1980.000	9999.0	9999.00		.01		
+38	NO	1.0		1188.000					
PBEAM	39	2	1.970	9999.0	251.45		.01		
+39	NO	1.0		.950	49.35				
PBEAM	39	2	4.140	9999.0	323.80				
+39	NO	1.0		2.140	123.20				

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PBEAM	40	2	4.140	9999.0	284.10				+40
+40	NO	1.0	2.180		140.90				
PBEAM	41	2	5.590	9999.0	376.40				+41
+41	NO	1.0	2.834		124.70				
PBEAM	42	2	3.942	9999.0	379.30				+42
+42	NO	1.0	2.088		112.40				
PBEAM	43	2	2.886	9999.0	350.15				+43
+43	NO	1.0	2.340		293.75				
PBEAM	44	2	2.340	9999.0	293.75				+44
+44	NO	1.0	1.430		99.875				
PBEAM	45	2	1.430	9999.0	99.875		.001		+45
+45	NO	1.0	1.521		76.375				
PBEAM	46	2	2.250	9999.0	215.00		.001		+46
+46	NO	1.0	2.250		162.00				
PBEAM	47	2	2.250	9999.0	162.00				+47
+47	NO	1.0	1.875		133.00				
PBEAM	48	2	1.875	9999.0	133.00				+48
+48	NO	1.0	2.250		46.00				
PBEAM	49	2	1.256	1.	41.26		.001		

PBEAM	169	2	4.200	1.	20.00	.001	+169	+1031	NO	1.	.638206	13.539	+1031A
+169	NO	1.0	3.210		20.00		+169A	+1031A	O.	1.	-5.84-2		
+169A	O.	1.		.0000				PBEAM	1033	2	0.0327	1.	5.4
PBEAM	170	2	3.210	1.	20.00	.001	+170	+1033	NO	1.	0.03526	0.529	+1033A
+170	NO	1.0	3.300		20.00		+170A	+1033A	O.	1.	-7.53-2		
+170A	O.	1.		.0000				PBEAM	1034	2	.461906	1.	13.539
PBEAM	171	2	1980.0001		9999.00	.001	+171	+1034	NO	1.	.371385	8.407	+1034A
+171	NO	1.0	1980.000		9999.00		+171A	+1034A	O.	1.	.217		
+171A	O.	1.		.0000				PBEAM	1035	2	0.1134	1.	.241
PBEAM	172	2	1.230	1.	84.87	.001	+172	+1035	NO	1.	0.0864	.140	+1035A
+172	NO	1.0	1.000		57.12		+172A	+1035A	O.	1.	.270		
+172A	O.	1.		.2063				PBEAM	1036	2	.371385	1.	7.726
PBEAM	173	2	1.125	1.	41.92	.001	+173	+1036	NO	1.	.208421	2.466	+1036A
+173	NO	1.0	1.188		46.53		+173A	+1036A	O.	1.	.562		
+173A	O.	1.		-.0541				PBEAM	1037	2	0.0864	1.	.140
PBEAM	174	2	.750	1.	12.63	.001	+174	+1037	NO	1.	0.06364	.0759	+1037A
+174	NO	1.0	1.063		23.78		+174A	+1037A	O.	1.	.303		
+174A	O.	1.		-.3448				PBEAM	1038	2	0.54612	1.	5.551
PBEAM	175	2	1059.3001		9999.00	.001	+175	+1038	NO	1.	0.58212	5.807	+1038A
+175	NO	1.0	841.500		9999.00		+175A	+1038A	O.	1.	-6.38-2		
+175A	O.	1.		.0000				PBEAM	1039	2	0.19404	1.	4.814
PBEAM	176	2	75.000	1.	2.98	.001	+176	+1039	NO	1.	0.15936	2.212	+1039A
+176	NO	1.0	79.000		12.10		+176A	+1039A	O.	1.	.196		
+176A	O.	1.		.0000				PBEAM	1040	2	0.15936	1.	2.212
PBEAM	177	2	79.000	1.	12.10	.001	+177	+1040	NO	1.	0.1296	.140	+1040A
+177	NO	1.0	82.000		29.71		+177A	+1040A	O.	1.	.206		
+177A	O.	1.		.0000				PBEAM	1041	2	0.216	1.	.233
PBEAM	178	2	82.000	1.	29.71	.001	+178	+1041	NO	1.	0.1411	.0995	+1041A
+178	NO	1.0	85.000		29.71		+178A	+1041A	O.	1.	.419		
+178A	O.	1.		.0000				PBEAM	1043	2	.1148	1.	.239
PBEAM	179	2	85.000	9999.0	46.06	.001	+179	+1043	NO	1.	.118531	.255	+1043A
+179	NO	1.0	90.000					+1043A	O.	1.	-3.20-2		
PBEAM	180	2	90.000	9999.0	46.06	.001	+180	+1043	NO	1.	0.02716	1.	3.2
+180	NO	1.0	55.800		31.90		+181	+1045	NO	1.	0.02891	0.119	+1045A
PBEAM	181	2	990.000	1.	9999.00	.001	+181	+1045A	O.	1.	-6.24-2		
+181	NO	1.0					+182	+1046	NO	1.	.118531	1.	.255
PBEAM	182	2	990.000	1.	9999.00	.001	+182	+1046	NO	1.	.103033	.193	+1046A
+182	NO	1.0						+1046A	O.	1.	.140		
PBEAM	1001	2	1.34778	1.	14.325		+1001	PBEAM	1047	2	0.02568	1.	0.001
+1001	NO	1.	1.32951		14.209		+1001A	+1047	NO	1.	0.02513		+1047A
+1001A	O.	1.		1.36-2				+1047A	O.	1.	2.16-2		
PBEAM	1002	2	1.32951	1.	14.209		+1002	PBEAM	1048	2	.103033	1.	.193
+1002	NO	1.	1.23648		13.640		+1002A	+1048	NO	1.	.082328	.123	+1048A
+1002A	O.	1.		7.25-2				+1048A	O.	1.	.223		
PBEAM	1003	2	1.23648	1.	13.640		+1003	PBEAM	1049	2	.082328	1.	.637
+1003	NO	1.	1.09137		12.836		+1003A	+1049	NO	1.	0.05289	.953	+1049A
+1003A	O.	1.		.125				+1049A	O.	1.	.435		
PBEAM	1004	2	1.09137	1.	12.836		+1004	PBEAM	1050	2	12.9	1.	.952
+1004	NO	1.	0.85176		11.727		+1004A	+1050	NO	1.	2.9	.15	+1050A
+1004A	O.	1.		.247				+1050A	O.	1.	1.266		
PBEAM	1005	2	0.85176	1.	11.727		+1005	PBEAM	1051	2	0.41616	1.	4.768
+1005	NO	1.	0.57309		10.782		+1005A	+1051	NO	1.	0.39888	4.214	+1051A
+1005A	O.	1.		.391				+1051A	O.	1.	4.24-2		
PBEAM	1007	2	0.5201	1.	4.137		+1007	PBEAM	1052	2	0.28808	1.	3.968
+1007	NO	1.	0.5704		4.188		+1007A	+1052	NO	1.	0.22399	2.323	+1052A
+1007A	O.	1.		-9.23-2				+1052A	O.	1.	.250		
PBEAM	1009	2	0.05068	1.	7.4		+1009	PBEAM	1053	2	0.22399	1.	2.323
+1009	NO	1.	0.05704				+1009A	+1053	NO	1.	0.13195	.877	+1053A
+1009A	O.	1.		-.118				+1053A	O.	1.	.517		
PBEAM	1010	2	0.68448	1.	11.387		+1010	PBEAM	1054	2	10.15	1.	1.104
+1010	NO	1.	0.65988		10.584		+1010A	+1054	NO	1.	2.3	.15	+1054A
+1010A	O.	1.		3.66-2				+1054A	O.	1.	1.261		
PBEAM	1011	2	0.65988	1.	3.834		+1011	PBEAM	1056	2	0.0772	1.	.112
+1011	NO	1.	0.58224		3.781		+1011A	+1056	NO	1.	.07868	.116	+1056A
+1011A	O.	1.		.125				+1056A	O.	1.	-1.90-2		
PBEAM	1012	2	0.4852	1.	2.985		+1012	PBEAM	1057	2	0.07868	1.	.116
+1012	NO	1.	0.3817		3.085		+1012A	+1057	NO	1.	0.06116	.0701	+1057A
+1012A	O.	1.		.239				+1057A	O.	1.	.251		
PBEAM	1013	2	0.3817	1.	4.113		+1013	PBEAM	1058	2	0.06116	1.	.587
+1013	NO	1.	0.2527		3.779		+1013A	+1058	NO	1.	.0332	.173	+1058A
+1013A	O.	1.		.407				+1058A	O.	1.	.593		
PBEAM	1014	2	1.1795	1.	32.608		+1014	PBEAM	1059	2	8.3	1.	.173
+1014	NO	1.	1.24325		37.764		+1014A	+1059	NO	1.	1.8	.15	+1059A
+1014A	O.	1.		-5.26-2				+1059A	O.	1.	1.287		
PBEAM	1015	2	1.24325	1.	35.291		+1015	PBEAM	1060	2	0.6004	1.	1.874
+1015	NO	1.	1.26225		36.787		+1015A	+1060	NO	1.	0.513	1.073	+1060A
+1015A	O.	1.		-1.52-2				+1060A	O.	1.	.157		
PBEAM	1016	2	1.0098	1.	36.787		+1016	PBEAM	1061	2	0.513	1.	1.073
+1016	NO	1.	0.897		28.514		+1016A	+1061	NO	1.	.2508	.265	+1061A
+1016A	O.	1.		.118				+1061A	O.	1.	.687		
PBEAM	1017	2	0.897	1.	28.514		+1017	PBEAM	1062	2	6.6	1.	.249
+1017	NO	1.	0.7106		17.378		+1017A	+1062	NO	1.	1.5	.15	+1062A
+1017A	O.	1.		.232				+1062A	O.	1.	1.259		
PBEAM	1018	2	0.88825	1.	17.378		+1018	PBEAM	1071	2	.563180	1.	30.125
+1018	NO	1.	0.569		7.448		+1018A	+1071	NO	1.	.456388	12.840	+1071A
+1018A	O.	1.		.438				+1071A	O.	1.	.209		
PBEAM	1020	2	.174168	1.	2.924		+1020	PBEAM	1072	2	.682631	1.	8.277
+1020	NO	1.	.192741		3.774		+1020A	+1072	NO	1.	.665175	7.859	+1072A
+1020A	O.	1.		-.101				+1072A	O.	1.	2.59-2		
PBEAM	1022	2	.004037	1.	8.0		+1022	PBEAM	1073	2	.554312	1.	7.859
+1022	NO	1.	.004701		3.		+1022A	+1073	NO	1.	.515704	6.811	+1073A
+1022A	O.	1.		-.152				+1073A	O.	1.	7.15-2		
PBEAM	1023	2	.192741	1.	3.774		+1023	PBEAM	1074	2	.58975	1.	14.868
+1023	NO	1.	.173225		1.931		+1023A	+1074	NO	1.	.531	6.135	+1074A
+1023A	O.	1.		.107				+1074A	O.	1.	.105		
PBEAM	1024	2	.173225	1.	1.931		+1024	PBEAM	1075	2	.675834	1.	32.711
+1024	NO	1.	.137473		.991		+1024A	+1075	NO	1.	.608902	25.555	+1075A
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PBEAM	1025	2	.137473	1.	.991		+1025	PBEAM	1076	2	.74152	1.	3.66
+1025	NO	1.	.085198		4.751		+1025A	+1076	NO	1.	.64649	10.312	+1076A
+1025A	O.	1.		.470				+1076A	O.	1.	.137		
PBEAM	1026	2	0.53326	1.	4.915		+1026	PBEAM	1077	2	0.59676	1.	12.691
+1026	NO	1.	0.56896		4.995		+1026A	+1077	NO	1.	0.50976	2.256	+1077A
+1026A	O.	1.		-6.48-2				+1077A	O.	1.	.157		
PBEAM	1027	2	0.97536	1.	4.995		+1027	PBEAM	1078	2	.531	1.	6.135
+1027	NO	1.	.93792		4.858		+1027A	+1078	NO	1.	.504625	5.541	+1078A
+1027A	O.	1.		3.91-2				+1078A	O.	1.	5.09-2		
PBEAM	1028	2	0.54712	1.	4.858		+1028	PBEAM	1079	2	0.52481	1.	5.541
+1028	NO	1.	0.43652		2.292		+1028A	+1079	NO	1.	0.49517	4.933	+1079A
+1028A	O.	1.		.225				+1079A	O.	1.	5.81-2		
PBEAM	1029	2	0.12472	1.	2.292		+1029	PBEAM	1080	2	0.41899	1.	4.933
+1029	NO	1.	0.07392		.998		+1029A	+1080	NO	1.	0.36586	6.161	+1080A
+1029A	O.	1.		.511				+1080A	O.	1.	.135		
PBEAM	1031	2	.602006	1.	12.135		+1031	PBEAM	1081	2	.902630	1.	30.774
													+1081

+1081	NO	1.	.842997	31.687
+1081A	O.	1.	6.83-2	
PBEAM	1082	2	.756112	1. 9.525
+1082	NO	1.	.694238	19.190
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PBEAM	1083	2	0.90882	1. 14.949
+1083	NO	1.	0.84618	2.210
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PBEAM	1084	2	0.9402	1. 2.762
+1084	NO	1.	0.8128	2.065
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PBEAM	1086	2	0.73172	1. 4.425
+1086	NO	1.	0.7194	4.277
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PBEAM	1089	2	0.616	1. 3.136
+1089	NO	1.	0.59752	2.951
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PBEAM	1090	2	0.59752	1. 3.319
+1090	NO	1.	0.56496	2.968
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PBEAM	1091	2	.964044	1. 26.163
+1091	NO	1.	.900046	33.946
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PBEAM	1092	2	.80058	1. 8.240
+1092	NO	1.	.740025	7.040
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PBEAM	1093	2	0.9867	1. 3.017
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PBEAM	1095	2	0.62528	1. 2.245
+1095	NO	1.	0.56416	5.554
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PBEAM	1096	2	1.12832	1. 3.720
+1096	NO	1.	1.03488	3.138
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PBEAM	1097	2	0.58212	1. .9936
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PBEAM	1098	2	0.46256	1. .878
+1098	NO	1.	0.41088	.692
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PBEAM	1099	2	0.56496	1. 2.968
+1099	NO	1.	0.50864	3.405
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PBEAM	1100	2	0.32368	1. 2.951
+1100	NO	1.	0.2702	1.360
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PBEAM	1101	2	0.2895	1. 1.434
+1101	NO	1.	0.237	1.561
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PBEAM	1102	2	.803494	1. 19.105
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+1104	NO	1.	0.53648	2.977
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PBEAM	1106	2	0.49888	1. 2.217
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PBEAM	1109	2	0.37695	1. .600
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+1110	NO	1.	0.31472	.368
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PBEAM	1111	2	0.15736	1. .242
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PBEAM	1112	2	0.1728	1. .303
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+1114	NO	1.	0.12232	.117
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PBEAM	1115	2	0.12232	1. .117
+1115	NO	1.	0.108	.991
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PBEAM	1117	2	0.85918	1. 3.590
+1117	NO	1.	0.77384	3.626
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PBEAM	1118	2	0.54624	1. 6.20
+1118	NO	1.	0.49872	2.937
+1118A	O.	1.	9.10-2	
PBEAM	1119	2	0.39482	1. 1.371

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+1120	NO	1.	0.27047	1.622
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PBEAM	1123	2	2.193	1. 0.577
+1123	NO	1.	1.7255	0.319
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+1124	NO	1.	1.411	0.186
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PBEAM	1127	2	0.230	1. .15
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+1131	NO	1.0	41.600	4.497
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PBEAM	1132	2	22.300	1. 1.258
+1132	NO	1.0	43.800	6.091
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PBEAM	1133	2	43.800	1. 6.091
+1133	NO	1.0	46.400	8.843
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PBEAM	1134	2	46.4	100. 13.5
+1134	NO	1.	50.68	10.
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PBEAM	1135	2	20.300	1. 1.601
+1135	NO	1.0	39.600	5.214
+1135A	O.	1.	-.644	
PBEAM	1136	2	17.900	1. 1.469
+1136	NO	1.0	35.300	4.849
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PBEAM	1137	2	35.300	1. 4.849
+1137	NO	1.0	39.910	7.360
+1137A	O.	1.	-.123	
PBEAM	1138	2	39.91	100. 10.5
+1138	NO	1.	40.37	10.
+1138A	O.	1.	-1.15-2	
PBEAM	1139	2	15.900	1. 1.286
+1139	NO	1.0	31.800	4.283
+1139A	O.	1.	-.667	
PBEAM	1140	2	14.000	1. .836
+1140	NO	1.0	28.200	2.827
+1140A	O.	1.	-.673	
PBEAM	1141	2	28.200	1. 2.827
+1141	NO	1.0	32.160	4.634
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PBEAM	1142	2	32.16	100. 7.94
+1142	NO	1.	32.70	10.
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PBEAM	1143	2	12.800	1. .537
+1143	NO	1.0	26.050	1.860
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PBEAM	1144	2	11.190	1. .541
+1144	NO	1.0	23.000	1.894
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PBEAM	1145	2	23.000	1. 1.894
+1145	NO	1.0	25.560	3.414
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PBEAM	1146	2	25.56	100. 6.5
+1146	NO	1.	27.16	10.
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PBEAM	1147	2	9.060	1. .492
+1147	NO	1.0	19.800	1.700
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PBEAM	1148	2	7.640	1. .210
+1148	NO	1.0	17.500	.929
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PBEAM	1149	2	17.500	1. .929
+1149	NO	1.0	18.620	1.942
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PBEAM	1150	2	18.62	100. 4.32
+1150	NO	1.	19.3	10.
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PBEAM	1151	2	7.100	1. .042
+1151	NO	1.0	16.900	.269
+1151A	O.	1.	-.817	
PBEAM	1152	2	22.300	1. 1.150
+1152	NO	1.0	24.900	1.440
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PBEAM	1153	2	20.300	1. .870
+1153	NO	1.0	22.300	1.150
+1153A	O.	1.	-.094	
PBEAM	1154	2	17.900	1. .630
+1154	NO	1.0	20.300	.870
+1154A	O.	1.	-.126	
PBEAM	1155	2	15.900	1. .470
+1155	NO	1.0	17.900	.630
+1155A	O.	1.	-.118	
PBEAM	1156	2	14.000	1. .340
+1156	NO	1.0	15.900	.470
+1156A	O.	1.	-.127	
PBEAM	1157	2	12.800	1. .260
+1157	NO	1.0	14.000	.340
+1157A	O.	1.	-.090	
PBEAM	1158	2	11.190	1. .280
+1158	NO	1.0	12.800	.260
+1158A	O.	1.	-.134	
PBEAM	1159	2	9.060	1. .260

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+1127A	
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+1133	

+1159	NO	1.0	11.190	.280		+1159A		+1206	NO	1.0	7.530	.03700		+1206A
+1159A	0.	1.		-.210				+1206A	0.	1.		.3859		
PBEAM	1160	2	7.640	1.	.170	+1160		PBEAM	1207	2	7.530	1.	.03700	.265
+1160	NO	1.0	9.060		.260	+1160A		+1207	NO	1.0	3.950		.00580	+1207A
+1160A	0.	1.		-.170				+1207A	0.	1.		.6237		
PBEAM	1161	2	7.100	1.	.120	+1161		PBEAM	1208	2	12.820	1.	1.20000	.265
+1161	NO	1.0	7.640		.170	+1161A		+1208	NO	1.0	12.820		1.20000	+1208A
+1161A	0.	1.		-.073				+1208A	0.	1.		.0000		
PBEAM	1162	2	43.800	1.	5.189	+1162		PBEAM	1209	2	12.820	1.	1.20000	.265
+1162	NO	1.0	41.600		5.636	+1162A		+1209	NO	1.0	10.280		.07100	+1209A
+1162A	0.	1.		.052				+1209A	0.	1.		.2199		
PBEAM	1163	2	39.600	1.	4.049	+1163		PBEAM	1210	2	10.280	1.	.07100	.265
+1163	NO	1.0	43.800		5.170	+1163A		+1210	NO	1.0	6.960		.02500	+1210A
+1163A	0.	1.		-.101				+1210A	0.	1.		.3852		
PBEAM	1164	2	35.300	1.	3.053	+1164		PBEAM	1211	2	6.960	1.	.02500	.265
+1164	NO	1.0	39.600		4.049	+1164A		+1211	NO	1.0	3.640		.00370	+1211A
+1164A	0.	1.		-.115				+1211A	0.	1.		.6264		
PBEAM	1165	2	31.800	1.	2.364	+1165		PBEAM	1212	2	0.7055	100.	0.32	.001
+1165	NO	1.0	35.300		3.040	+1165A		+1212	NO	1.	0.63		0.25	+1212A
+1165A	0.	1.		-.104				+1212A	0.	1.		.113		
PBEAM	1166	2	28.200	1.	1.762	+1166		PBEAM	1213	2	12.600	1.	.70000	.265
+1166	NO	1.0	31.800		2.354	+1166A		+1213	NO	1.0	11.690		.70000	+1213A
+1166A	0.	1.		-.120				+1213A	0.	1.		.0749		
PBEAM	1167	2	26.050	1.	1.444	+1167		PBEAM	1214	2	11.690	1.	.70000	.265
+1167	NO	1.0	28.200		1.754	+1167A		+1214	NO	1.0	9.420		.05530	+1214A
+1167A	0.	1.		-.079				+1214A	0.	1.		.2151		
PBEAM	1168	2	23.000	1.	1.274	+1168		PBEAM	1215	2	9.420	1.	.05530	.265
+1168	NO	1.0	26.050		1.431	+1168A		+1215	NO	1.0	6.360		.01900	+1215A
+1168A	0.	1.		-.124				+1215A	0.	1.		.3878		
PBEAM	1169	2	19.800	1.	1.019	+1169		PBEAM	1216	2	6.360	1.	.01900	.265
+1169	NO	1.0	23.000		1.269	+1169A		+1216	NO	1.0	3.330		.00290	+1216A
+1169A	0.	1.		-.150				+1216A	0.	1.		.6254		
PBEAM	1170	2	17.500	1.	.706	+1170		PBEAM	1217	2	11.400	1.	.40000	.265
+1170	NO	1.0	19.800		1.007	+1170A		+1217	NO	1.0	10.620		.40000	+1217A
+1170A	0.	1.		-.123				+1217A	0.	1.		.0708		
PBEAM	1171	2	16.900	1.	.588	+1171		PBEAM	1218	2	10.620	1.	.40000	.265
+1171	NO	1.0	17.500		.709	+1171A		+1218	NO	1.0	8.570		.01970	+1218A
+1171A	0.	1.		-.035				+1218A	0.	1.		.2137		
PBEAM	1181	2	0.341	100.	4.328	.001		PBEAM	1219	2	8.570	1.	.01970	.265
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+1181A	0.	1.		-.984				+1219A	0.	1.		.3939		
PBEAM	1182	2	1.604	1.	75.00000	.265		PBEAM	1220	2	5.750	1.	.00760	.265
+1182	NO	1.0	1.365		70.00000			+1220	NO	1.0	2.990		.00130	+1220A
+1182A	0.	1.		-.1611				+1220A	0.	1.		.6316		
PBEAM	1183	2	68.240	1.	70.00000	.265		PBEAM	1231	2	.189	1.	2.20872	3.000
+1183	NO	1.0	53.180		18.30000			+1231	NO	1.0	.614		25.02095	+1231A
+1183A	0.	1.		.2481				+1231A	0.	1.		-1.0587		
PBEAM	1184	2	1.064	1.	18.30000	.265		PBEAM	1232	2	.280	1.	1.74280	2.000
+1184	NO	1.0	.715		5.30000			+1232	NO	1.0	.315		2.20872	+1232A
+1184A	0.	1.		.3923				+1232A	0.	1.		.152		
PBEAM	1185	2	.715	1.	5.30000	.265		PBEAM	1233	2	.152	1.	1.15839	.900
+1185	NO	1.0	.370		.65000			+1233	NO	1.0	.168		1.42177	+1233A
+1185A	0.	1.		.6362				+1233A	0.	1.		-.1018		
PBEAM	1186	2	22.130	1.	7.00000	.265		PBEAM	1234	2	.226	1.	.74641	.700
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+1186A	0.	1.		.0524				+1234A	0.	1.		-.1127		
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+1187	NO	1.0	16.200		.95000			+1235	NO	1.0	.136		.65330	+1235A
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PBEAM	1191	2	18.680	1.	5.80000	.265		PBEAM	1241	2	16.200	1.	.01850	3.000
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+1191A	0.	1.		.0000				+1241A	0.	1.		-1.0660		
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+1192	NO	1.0	14.740		.28300			+1242	NO	1.0	16.200		.01850	+1242A
+1192A	0.	1.		.2358				+1242A	0.	1.		-.0944		
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+1193	NO	1.0	9.990		.09600			+1243	NO	1.0	14.740		.01400	+1243A
+1193A	0.	1.		.3841				+1243A	0.	1.		-.0975		
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RBAR	2283				

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SPCI	5	4	3009			405
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SPCADD	1	3	5			
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ENDDATA						